The sociophonology of rhoticity and *r*-sandhi in East Lancashire English

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Declaration

I hereby declare that this thesis is of my own composition, and that it contains no material previously submitted for the award of any other degree. The work reported in this thesis has been executed by myself, except where due acknowledgement is made in the text.

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Abstract

Most discussions of English phonology argue that rhoticity and *r*-sandhi are necessarily in complementary distribution, citing the diachronic path that led to the loss of rhoticity and the resulting synchronic $r \sim \varnothing$ alternations in non-rhotic dialects. However, some accounts suggest that 'it would not be surprising to discover cases of intrusive-*r* in rhotic dialects' (Harris 1994, see also Carr 1999, Uffmann 2007). In order to investigate how non-rhoticity and *r*-sandhi could be transmitted by dialect contact, this thesis uses data from speakers in five communities in Greater Manchester and East Lancashire. The locations are equally spaced along a twenty-mile route from Prestwich (a suburb of Manchester, where speakers are non-rhotic) to Accrington (a post-industrial mill-town which is on an 'island of rhoticity' (Britain 2009)). I show that individual speakers have variable levels of both rhoticity and *r*-sandhi, which matches research on early New Zealand English (Hay & Sudbury 2005). Beyond this key fact, I discuss several other aspects of the relationship between *r*-sandhi and rhoticity, including the phonological and dialectological significance of the patterns in the data.

First, linking-*r* and intrusive-*r* have different distributions in my data, despite the typical claim that they are synchronically the same process. This supports the idea that speakers are sensitive to a difference between words with and without an etymological *r*: I attribute this to the influence of orthography and to sociolinguistic salience of intrusive-*r*. Second, the nature of my sample population allows me to consider both change in apparent time and variation across geographical space. An apparent time comparison of the distribution of non-rhoticity and intrusive-*r* in the five Lancashire locations shows that these features are spreading by wave diffusion: they reach nearby locations before they reach locations further away. However, there is also a pattern of urban hierarchical diffusion in which the most isolated and rural location, Rossendale, lags behind Accrington in its loss of rhoticity. This is examined in the light of

local patterns of travel for work and leisure, which suggest that although Accrington is further than Rossendale from the non-rhotic 'sea' of surrounding speakers, socially constructed space is more significant than Cartesian distance in determining the amount of linguistic contact between speakers from different locations. Third, I show that levels of rhoticity are increasing for some young speakers in Rossendale, which supports the hypothesis that a local linguistic feature can have a 'last gasp' under pressure from a competing non-local feature before its eventual loss. However, the same speakers are also adopting intrusive-*r* more quickly than speakers from neighbouring areas and this is significant: while earlier research has suggested that the presence of hyperdialectal non-etymological *r* (e.g. *lager* [laɪgəˠ]) can be an indication of a loss of rhoticity in progress, the East Lancashire data show a different situation, where non-etymological *r* is for the most part restricted to sandhi contexts. This shows that rather than *r*-colouring becoming part of the realisation of certain vowels (e.g. *sauce* [sɔːˈs]), intrusive-*r* is becoming adopted as a hiatus-filling strategy: a phonological process is being used by some rhotic speakers independently of the loss of contrasts (e.g. *Leda* ∼ *leader*) which caused it to emerge in non-rhotic dialects.

I discuss these results in terms of *sociophonology*, which I use to convey the idea that the phonological process of hiatus-filling *r*-sandhi can spread through dialect contact, with a mixed phonological system emerging as a result. Although the data suggest a correlation between the loss of rhoticity and the development of *r*-sandhi, the nature of the overlap means that a phonological model must allow for speakers to have both features, even if rhoticity is eventually lost completely. Hay & Sudbury (2005) argue that the gradual development of linking and intrusive-*r* leading to their convergence to a single synchronic phenomenon 'is not a process that can be well described by any categorical, phonological grammar'. I show that the current situation in East Lancashire speech can be described by existing phonological models with underlying representations and associated surface forms. These existing models do not rule out a parallel distribution for rhoticity and intrusive-*r*, in which individual speakers can have both features.

This thesis provides some new dialectological data for an under-researched area of North West England, a discussion of phonological means of accounting for patterns in these data, and a discussion of the influence of socio-cultural spatiality on linguistic behaviour.

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But I wouldn't know a single word to say
If I flattened all the vowels
And threw the 'R' away

The Proclaimers, 'Throw The "R" Away',
This Is The Story, Chrysalis, 1987.

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Chapter 1

Introduction

In this thesis I address a phonological question by using methods of data collection and assumptions about the behaviour of individual speakers and groups of speakers that have been developed in the field of sociolinguistics. In doing so, I show that there are complex patterns of variability in real-world data collected from speakers in communities, and argue that phonological models need to be able to account for this evidence of variation and change if they are to bear a relation to 'the actual speech of the members of the communities in question' (Carr 2000: 79). At the same time, I show that this variation and change is conditioned by systemic phonological factors; a convincing account must reflect this. With this in mind, I take the term sociophonology to show this double focus: there are social factors at work in the variation and change that can be observed in real data; at the same time the variation and change is shaped by what is possible and predictable in a phonological system.

This combination of sociolinguistic and phonological investigation is at odds with the stated aims of some phonologists. For example, Broadbent argues that aspects of phonological systems can be subject to socially motivated suppression and that 'such social suppression is not something that should be reflected in the grammatical analysis ... in order to obtain a clear grammatical generalization we need to abstract away from such "sociolinguistic" suppression' (1991: 282). However, in this thesis my aim is to consider variation and change in phonological systems rather than to propose a static model of a given idealised system. As such, the sociolinguistic as well as the phonological conditioning factors are relevant: this difference in approach is due to a different research focus.

My use of a set of real-world data matches the approach adopted in the developing field of corpus phonology (Durand et al. forthcoming), in which time-aligned annotated transcriptions of audio recordings allow for the investigation of phonological systems while maintaining a link

with the audio recordings. This means that the raw material is always available for auditory or acoustic phonetic analysis and that proposed phonological models can be evaluated in the light of the real-world data upon which they were based.

The central phonological question in this thesis is the relationship between rhoticity and *r*-sandhi in English, and specifically whether the development of *r*-sandhi is necessarily linked to a loss of rhoticity. These terms are fundamental to the entire thesis, so I will begin by briefly summarising how they are used. Rhoticity is a label used to describe '*r*-ful dialects': those in which a phonetic rhotic is present in syllable codas such as *farm* [fɑːɹm][1]. In contrast, speakers of non-rhotic dialects can realise a rhotic only immediately before a vowel: a word such as *farm* is pronounced [fɑːm] in Received Pronunciation (RP), for example. 'Sandhi' phenomena occur at word or morpheme boundaries: the term '*r*-sandhi' refers to the use of a rhotic to fill the hiatus between two vowels at a morpheme or word boundary. This term is usually argued to be relevant only to description of non-rhotic speech: in a phrase such as *far and away*, non-rhotic speakers would realise a rhotic, [fɑːɹ ənd əweɪ], even though in non-prevocalic contexts *far* would be [fɑː]. In examples such as this, which are conventionally labelled 'linking-*r*', rhotic speakers would produce a surface rhotic regardless of the following segment, so it follows that it is only non-rhotic speakers who have an active phonological process leading to the production of [ɹ] in these contexts, and alternations between '*r*-less' and '*r*-ful' forms of the same words. The situation is complicated because the loss of a rhotic in syllable codas causes another change in the phonological systems of non-rhotic speakers: a loss of contrast between words which historically did have a coda rhotic and those which did not, for example the words *far* and *fah* (as in tonic sol-fa musical notation). Non-rhotic speakers would pronounce both of these as [fɑː] in non-prevocalic contexts. A rhotic is produced when *far* is followed by a vowel (the 'linking-*r*' mentioned above) and many non-rhotic speakers will also produce a rhotic when *fah* is followed by a vowel, even though there is no etymological *r* in the word. For this reason, this phenomenon is labelled 'intrusive-*r*'. It is typically argued that only non-rhotic speakers will produce intrusive-*r* because rhotic speakers have not lost the contrast between '*r*-less' and '*r*-ful' pairs such as *far* and *fah*. These arguments will be discussed in more detail in Chapter 2.

1. The phoneme /ɹ/ may be realised with several different phonetic variants: in this thesis I use the symbol for a postalveolar approximant, [ɹ], because this is the typical realisation in my East Lancashire data. Where the phonetic nature of the rhotic varies and this is relevant to my argument, I will use the appropriate phonetic symbols.

So, most standard accounts of English phonology argue that the development of *r*-sandhi in non-rhotic varieties was causally linked to an earlier loss of rhoticity, and, therefore, that the two phenomena are synchronically in complementary distribution. However, recent empirically-based research using a corpus of New Zealand archive speech recordings (Hay & Sudbury 2005) has suggested that, although there is a causal link between the loss of rhoticity and the development of *r*-sandhi, it is possible for the two phenomena to be in parallel distribution: some speakers can be at least partially rhotic and also produce tokens of *r*-sandhi. While this research does not challenge the idea that a process of loss of rhoticity led to the process of development of *r*-sandhi, it does suggest that the two phenomena can overlap, and that a phonological model should be able to explain how a speaker can both produce a coda rhotic and produce an intrusive-*r*.

This thesis considers data collected from speakers in East Lancashire, which is an area of the United Kingdom where rhoticity is still evident, but where existing dialectological research predicts that this is under sociolinguistic pressure from speakers in surrounding areas where non-rhotic speech is the norm. The present-day population of this area, therefore, provides an opportunity to investigate the mixed rhotic-and-*r*-intruding behaviour noted by Hay & Sudbury (2005), and to see whether further light can be cast on the means by which an individual speaker can be both rhotic and *r*-intruding.

This central phonological issue, and the nature of the data used to investigate it, mean that this thesis covers a range of topics. In terms of phonology, the question of the relationship between rhoticity and *r*-sandhi is addressed. The results of the geographically based survey at the heart of this thesis are relevant to dialectological issues such as dialect levelling and to considering the importance of geography, and more specifically of socially constructed spatiality, on the distribution of rhoticity and *r*-sandhi. Recent work in sociophonology has attempted to connect (1) analysis of variation in the speech of individual speakers and in communities of speakers with (2) modelling of phonological systems. By their nature, the data analysed in this thesis lend themselves to both areas of interest, and to the sociophonological links between these areas. While aspects of the relationship between rhoticity and *r*-sandhi are interesting for testing cross-linguistic phonological and sociophonological models, this research is also focused on English-specific issues concerning this relationship and its connection to accounts of the diachronic development of English. Methodolological issues of how to gather useful empirical data are discussed, with specific reference to the fact that *r*-sandhi, particularly so-called

'intrusive-*r*', occurs at a relatively low frequency in everyday speech. This means that structured elicitation tasks need to be used, but these are in themselves problematic in some ways which are discussed in the thesis. So, the thesis is structured in order to address questions ranging from 'micro' issues with a local focus, such as the dialectal distribution of linguistic features in East Lancashire, to questions with a precisely specified linguistic focus, such as the phonological relationship between rhoticity and *r*-sandhi in dialects of English, to 'macro' questions such as the ability of phonological models to deal with variation at the level of individual speakers and across speakers. These research questions are detailed below.

1.1 Research Questions

Although the starting point for this research is an interest in whether phonological and sociophonological models can account for speakers who produce coda rhotics and tokens of intrusive-*r*, the nature of the data used and the social and spatial characteristics of the speakers who produced the data mean that other research questions arise in the process of trying to approach this central issue. My research questions are introduced below, followed by a brief discussion of each one.

(RQ1) What is the current dialectological distribution of rhoticity and *r*-sandhi in East Lancashire?

(RQ2) Do rhoticity and *r*-sandhi in East Lancashire vary with respect to social factors?

(RQ3) Do rhoticity and *r*-sandhi in East Lancashire vary with respect to linguistic context?

(RQ4) Do rhoticity and *r*-sandhi overlap in their distribution?

(RQ5) What implications do the East Lancashire data have for dialectology and sociolinguistics?

(RQ6) What implications do the East Lancashire data have for phonological theory?

(RQ7) How useful is a sociophonological approach to modelling the kind of variation found in East Lancashire?

Several of these questions are effectively 'cover questions' which will involve answering several subquestions. For example, RQ1-4 all involve essentially descriptive accounts: what are the patterns in the data? In order to provide a full descriptive answer to RQ1, at least two subquestions are involved. RQ1a: What is the dialectal distribution of rhoticity? RQ1b: What is the dialectal distribution of *r*-sandhi? And then *r*-sandhi itself can be broken down into 'linking-*r*' and 'intrusive-*r*': while these are typically modelled as the same process in non-rhotic varieties,

diachronic accounts of the development of *r*-sandhi typically require them to have been separate at one stage in the history of the variety, in the sense that linking-*r* alternations existed before *r* came to be used in 'intrusive' sandhi contexts. Vennemann's rule-inversion account makes this separation clear in the choice of labels given to stages in the diachronic development of a consonant epenthesis rule: 'Stage IIa' (1972: 216), which would correspond to the production of linking-*r*, precedes 'Stage IIb' (ibid.), in which the epenthesis rule is extended to contexts in which there had been no historical /r/. Similar arguments are made in many accounts, such as Wells (1982: 219) or Trudgill (2000: 57). Furthermore, there are attested dialects which have linking but no intrusive-*r* (Wells 1982: 224, McMahon 2000: 261). Although speakers of such varieties are often argued to be using extra-phonological knowledge, such as awareness of spelling, my empirical approach should be open to the possibility of linking-*r* and intrusive-*r* being separate. Rather than have a multitude of research questions, I will treat the process of answering RQ1-4 as the descriptive part of the thesis; these questions will be explored briefly below in Section 1.1.1 and then addressed more fully in Chapters 2, 3 and especially Chapter 5. Chapters 2 and 3 deal with existing research on the linguistic relationship between rhoticity and *r*-sandhi, the dialectal spread of these features in Lancashire and some relevant social and historical information about East Lancashire; Chapter 5 presents detailed results from data I have collected.

The remaining questions are more analytical and outward-looking. While a descriptive account of rhoticity and *r*-sandhi in East Lancashire is interesting for its own sake, my data are also relevant to wider questions about how dialect contact and sociolinguistic processes can lead to variation and change, which is the focus of RQ5, and is discussed in Chapter 6. As I have mentioned, the particular phenomena of rhoticity and *r*-sandhi have been discussed at length in the phonological literature: new data (containing potentially unexpected patterns) clearly have implications for the evaluation of different phonological accounts. RQ6 focuses on these implications, which are discussed in Chapter 7. Finally, RQ7 returns to the idea of sociophonology, as used in the title of this study. Chapter 8 argues that this sociophonological approach is the most convincing means of accounting for the East Lancashire data.

I now explain my research questions in more detail, starting with the more descriptive questions.

1.1.1 Questions relevant to a descriptive account of rhoticity and r*-sandhi in East Lancashire*

RQ1 can be broken down into subquestions, focussing on distribution of rhoticity (RQ1a) and *r*-sandhi (RQ1b). Each of these could be answered in exhaustive geographical and linguistic detail; answering one of these questions could be a large-scale data-collection and analysis task in its own right. However, given the practical constraints of carrying out this research, I adopt a compromise approach: geographical location is clearly one variable in my sample population, but, given the potential for idiolectal variation between speakers, I need to have data from more than one speaker in each location. In my survey, rather than collect data from one person in each of six different locations, I chose to collect data from six people in the same location. However, I then needed to repeat this data collection in other geographical locations, which meant another six participants in each location. So, rather than aim at blanket coverage of East Lancashire with data from as many locations as possible, I present data from five locations. Four of these locations are along one valley in East Lancashire: the Irwell Valley, which runs from the northern suburbs of Manchester to Rossendale (which is formed from the small towns of Haslingden, Helmshore and Rawtenstall); the fifth location, Accrington, is approximately four miles north of Rossendale. From south to north, the locations are Prestwich, Bury, Ramsbottom, Rossendale and Accrington. A detailed account of the social, historical and geographical nature of this area is presented in Chapter 3, together with information about the linguistic features of the inhabitants of this area, but the key point is that existing dialectal knowledge predicts that there will be an almost entirely non-rhotic population at the southern end of this valley and a largely rhotic population at the northern end. Furthermore, there is evidence of population movement, with people commuting to work and travelling for leisure activities and so on, which means there is the sort of speaker-contact which can lead to sociolinguistically motivated changes. Given its social salience in England, rhoticity could well be a linguistic feature that is likely to change under sociolinguistic pressure. This particular area and these populations of speakers are, therefore, precisely suited to an investigation of variation in rhoticity in East Lancashire.

The sort of answer that can be given for RQ1a from my data is partly qualitative: it is certainly true that a visitor to Accrington, say, will notice that the inhabitants sound ‘more rhotic’ than inhabitants of Prestwich do. Furthermore, in England in the early 21st century, rhoticity is marginalised geographically (in the popular consciousness it is typically associated with the

rural South West of England), and its rarity and stigmatised status means that non-rhotic English visitors to Accrington would be likely to notice the rhoticity of its inhabitants. However, in addition to these qualitative comments, the recorded data I analyse in this research allow me to make quantitative comments about the percentage of coda rhotics produced by individual speakers in each location, and to calculate mean values for younger or older speakers in each location. The figures derived from conversational speech should be comparable to those calculated in other surveys, such as that carried out on New Zealand archive recordings by Hay & Sudbury (2005). A sub-question which these figures will address is the extent to which any of the participants in the research is consistently rhotic or non-rhotic. It may be that nobody produces audible coda rhotics in every possible instance, and this will have implications for modelling the relationship between rhoticity and *r*-sandhi.

RQ1b is closely linked to RQ1a in terms of how it may be answered. Given the set of recorded data mentioned above, the same sort of quantitative comments can be made: figures for percentages of rhotics produced in sandhi-environments can be calculated for individual speakers and groups of speakers in each of the locations used for data collection. Again, there is an interesting sub-question concerning the extent to which any individual speaker consistently does or does not produce *r*-sandhi. We know, for instance, that even speakers who would be predicted to have *r*-sandhi as part of their phonological systems may not necessarily produce it consistently. To some extent it is conditioned by conscious control: it is possible for speakers of RP to specifically avoid such shibboleths as 'Laura Norder' for *law and order* even though they would have linking-*r* in *lore and mystery*. Clearly, if *law* and *lore* have merged for non-rhotic speakers, then specific avoidance of intrusive-*r* must entail some application of non-phonological factors. However, where intrusive-*r* does occur, it may be conditioned by other factors including linguistic ones such as the nature of the preceding or following segment, the nature of the prosodic context of the sandhi environment or the morphological nature of the sandhi environment.

RQ2 concerns social factors which may relate to variation in rhoticity and *r*-sandhi; again this can be broken down into RQ2a (rhoticity) and RQ2b (*r*-sandhi). My recorded speech data are structured according to two social factors (in addition to the spatial factor analysed in RQ1). These are speaker age and style of speech. The apparent-time analysis that can be carried out from the younger and older speakers in my sample population can be combined with the results for RQ1 to give an indication of potential variation in time and geographical space,

which would be expected if a change is in progress such that the area where rhotic speakers are found is shrinking. I have data which was collected from different tasks and, in common with many sociolinguistic surveys, I consider the possibility that these may result in different styles of speech: conversational speech data may well be different from reading data, for instance. I do not assume that reading data is necessarily more 'formal' than conversational data (cf. Baugh (2001: 114) who suggests that 'formal speech' and 'informal speech' could be potential synonyms for 'careful' and 'casual' speech, as used by Labov (1984)). Indeed, in my recordings some speakers adopted a very lively performance style during the reading activities which could well be regarded as being less formal than their speech when in conversation with me, while at the same time reflecting some care being taken in the creation of an entertaining performance. However, I treat speech style as a social variable, or at least as a variable which is closer to typical social variables (age, class etc) than it is to typical linguistic variables (phonological context etc). This approach fits Bell's (1984, 2001) treatment of style: 'variation on the style dimension within the speech of a single speaker derives from and echoes the variation which exists between speakers on the "social" dimension' (Bell 2001: 145). If rhoticity or *r*-sandhi show patterns of style-shifting, this could be relevant in accounting for the variation and change in these linguistic features. Existing research suggests that *r*-sandhi can pattern differently in different dialects with respect to style of speech. For instance, it is often claimed that *r*-sandhi, with particular reference to intrusive-*r*, is stigmatised for some speakers of RP (Cruttenden 2001: 289), yet Foulkes (1997) finds that rates of intrusive-*r* actually increase in careful speech styles for some speakers of Tyneside English.

RQ3 addresses linguistic context, and can be answered in terms of segmental phonological context and in terms of prosodic factors, such as lexical stress and phrasal stress. Clearly, there is variation in what each speaker produces in the conversational data, but the structured nature of the reading and elicitation data means that a consistent range of contexts can be considered in these styles of speech across the sample population of speakers. In focusing on *r*-sandhi (RQ3b) again I can consider segmental phonological context and prosodic factors. This is an important question to address, because existing work on *r*-sandhi suggests that it is variable, even among speakers who have it as a productive phonological process. If even non-rhotic speakers produce *r*-sandhi in only a proportion of the possible occurrences, then it is important to establish whether any particular linguistic contexts condition this variation.

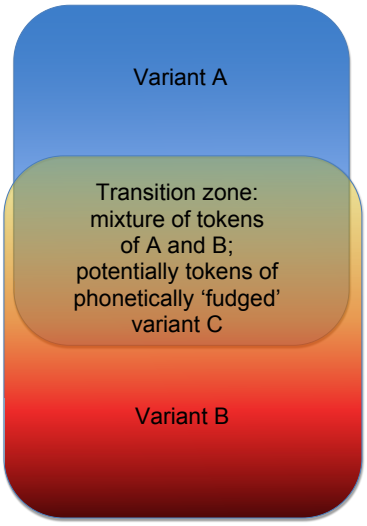


Figure 1.1
A transition zone between dialects which have different variants for a given feature.

RQ4 addresses the potential overlap between rhoticity and *r*-sandhi. This can be answered in terms of geographical 'overlap': it would certainly be possible for speakers in one particular location to exhibit both rhoticity and *r*-sandhi. In traditional dialectological terms this would mean that if the results of RQ1a and RQ1b were used to plot isoglosses for rhoticity and *r*-sandhi, the resulting areas would overlap to some extent. This idea of overlapping areas on a dialect map has been discussed many times before. For example, if the vowel in a particular lexical set is A in one variety and B in a neighbouring variety, it may be that there is a geographical area that functions as a transition zone (Chambers & Trudgill 1998: 104). In this zone speakers may have one or other vowel, a mixture of tokens of each vowel, or a fudged vowel C that is phonetically intermediate between A and B (see Figure 1.1). The situation with rhoticity and *r*-sandhi would be more complex than that description might imply though: if the two features are predicted to be in complementary distribution so that a phonological system is either rhotic or has an *r*-sandhi process, then such a geographical overlap would suggest that there are (at least) three categories of speaker:

1. Group A: rhotic with no *r*-sandhi
2. Group B: non-rhotic with *r*-sandhi
3. Group C: both rhotic and with *r*-sandhi

The third category of speaker poses a problem for the hypothesis that rhoticity and *r*-sandhi are complementary. It could be argued that such speakers somehow switch between different

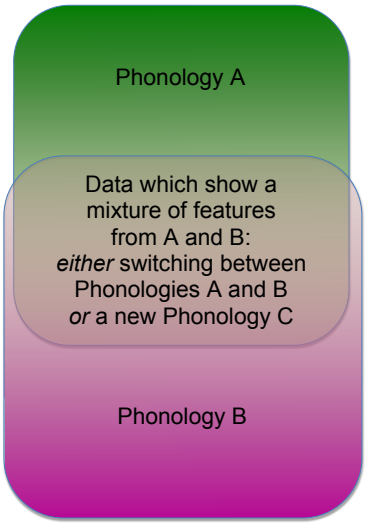


Figure 1.2
A 'transition zone' between phonological systems which have been argued to be mutually exclusive.

phonological systems: there is grammar competition (Kroch 1989, Honeybone to appear) so that although overall they seem to display both phenomena, in fact at any particular time they will have the phonology of Group A or Group B. However, it could be the case that they have a third phonological system that is simultaneously both rhotic and has *r*-sandhi (see Figure 1.2). The existence of a 'Group C' phonological system would challenge some existing models of the phonologies of these two phenomena, specifically those models which argue that intrusive-*r* results when the *r* ∼ ∅ alternations that non-rhotic speakers produce in historically *r*-ful words spread to historically *r*-less words (e.g. Johansson 1973, Wells 1982 and many others). These approaches are predicated on the non-rhotic-and-linking-*r* behaviour of a word such as *lore* being identical to the *r*-less-and-intrusive-*r* behaviour of a word such as *law*. Such accounts argue that *law* will not come to behave in this way if *lore* has not already begun to show this alternation: if the citation form of *lore* has not merged with the citation form of *law* then these models do not allow intrusive-*r* to develop. The existence of a 'Group C' system would suggest that, although the diachronic causal link between loss of rhoticity and development of *r*-sandhi may be supported by widespread historical and empirical evidence, it is possible for rhotic speakers to have a process leading to intrusive-*r*. The motivation of such a process would be open to question: it could arise independently if avoiding hiatus became a high priority for these speakers, or it could spread from non-rhotic speakers, who have already developed it, to rhotic speakers, even though these rhotic speakers still produce rhotics in syllable codas.

1.1.2 Questions involving the application of the East Lancashire data to wider issues in linguistics

Moving beyond the specific details of the distributions of these two phonological features in East Lancashire, the answer to RQ5 will explore how the patterning of the data relates to wider ideas such as dialect levelling and the issue of using the concept of a socially-constructed 'spatiality' (Britain 2002b) as a means of explaining linguistic variation in a way that bridges traditional dialectology and sociolinguistics.

RQ6, addressing the implications of the East Lancashire data for phonological theory, is clearly a 'macro' question of wide-ranging relevance for phonological theory. While this thesis does not set out to propose a new phonological analysis, it does present data which may cast light on existing attempts to account for variation within phonological models, and these data may well be useful for future developments in phonological theory. East Lancashire speakers who are simultaneously rhotic and *r*-intruding would cause a problem for phonological analyses which explicitly predict that there can be no such speakers. The answer to RQ6 will consider whether there are ways of reconciling the empirical data with these phonological approaches, and whether certain theories fit the data better than do others.

RQ7 involves addressing links between the explanations in the answers to RQ5 and RQ6. The entire structure of the thesis entails bringing together ideas of variation, traditionally considered in the fields of dialectology and sociolinguistics, and models of phonological linguistic structure, some of which do not deal with variation: as Honeybone claims, '[t]he models that formalist, theoretically-minded linguists work with typically assume that linguistic behaviour is categorical and idealise away from the variation that is found in speech' (to appear: 1). Put starkly, it seems that:

1. Some dialectological and sociolinguistic approaches account for socially-conditioned variation but do not account for the linguistically structured nature of the data;
2. Some phonological approaches explain the linguistic structures but do not account for the socially-conditioned variation in the data.

This dichotomy could be regarded as overly dramatic: *good* dialectological or sociolinguistic investigations should account for structural, systemic linguistic factors as well as social factors. However, the existence of such an opposition between phonological and sociolinguistic approaches has been noted by others, and recent work in sociophonology has suggested that it is possible to

attempt an integrated approach, which acknowledges the significance both of systemic linguistic patterns and of socially structured patterns. For example, Johnson & Britain (2007) explore the spread of L-vocalisation in England, and argue that, while sociolinguistic patterns of dialect contact provide part of the explanation for the spread of vocalised /l/, phonological factors are also part of the story. Specifically, for a variety to adopt L-vocalisation, speakers already need to have a system of [l]∼[ɫ] allophony ('clear' versus 'dark' *l*). Johnson & Britain (2007) claim that their approach is a 'marriage' between sociolinguistics and phonology, which 'involves phonologists getting their hands dirty and sociolinguists looking for a phonological explanation' (2007: 295). This is precisely the approach I take with my investigation of *r*-sandhi and rhoticity in East Lancashire.

1.2 Structure of the thesis

Laing (2009: 237) distinguishes between two approaches to investigating an academic question. The 'Mystery Bus Tour' approach introduces the question, presents various pieces of evidence in order (the 'sights' on the bus tour) and finally arrives at a 'previously unstated' (2009: 237) destination, the reader having been guided along the same journey that the writer has previously undertaken in carrying out the research. In contrast, the 'Court Room' approach involves stating the 'ultimate destination' at the start, and then presenting a series of pieces of evidence to support this already-stated conclusion. (She mentions a third, less-respectable, approach, the 'Conjuring Trick', in which the link between the evidence and the conclusion is tenuous at best). This thesis combines elements of the Mystery Bus Tour and Court Room approaches. Because of its length, some 'ultimate destinations' are announced at the start. For example, as I will show, there *are* some speakers who produce coda-*r* and intrusive-*r*: the answer to RQ4 is 'yes' and the results in Chapter 5 will support this answer. Some answers to other RQs are stated early on, and then supported by evidence. So, with regard to RQ6, there are some historical-phonological accounts of rhoticity and *r*-sandhi which show that the relationship between the two phenomena is not mutually exclusive by definition, but is contingent on socio-historical factors, which, for most varieties of English, mean that intrusive-*r* is restricted to non-rhotic speakers. However, if the social or cultural conditioning factors change, as they have for some speakers in East Lancashire, then it is possible for speakers who have not lost rhoticity to produce intrusive-*r*. Details of how this change might have happened and its implications for existing accounts of rhoticity and *r*-sandhi will emerge as evidence is presented through the thesis. Not all conclusions are

stated at the outset though. Laing favours the 'Mystery Bus Tour' approach in part because 'part of the allure is that all the "sights" should be fully investigated and appreciated before the dénouement' (2009: 237). Several issues connected to the social, historical and phonological factors influencing rhoticity and *r*-sandhi will emerge and be discussed during the thesis, in an edited version of the process I went through in carrying out the research. In this spirit, I also discuss hypotheses that did *not* turn out to be supported by the evidence: I seek to avoid a selective approach which could indicate some sort of sleight-of-hand resulting from the use of the 'Conjuring Trick' approach mentioned by Laing.

The thesis is organised in such a way as to address the Research Questions set out in Section 1.1. To begin with, it is necessary to provide some more detailed contextual information about the topic in question. Chapter 2 summarises existing phonological literature on *r*-sandhi and its relationship to rhoticity. This in itself is a wide-ranging topic and could be explored at far greater length than is possible in one chapter in this thesis. In order to ensure a clear focus on the topic of this thesis, the discussion of literature is structured so as to consider:

1. accounts of the diachrony of rhoticity and *r*-sandhi;
2. accounts of dialectal variation in rhoticity and *r*-sandhi;
3. phonological accounts which argue that rhoticity and *r*-sandhi are necessarily in complementary distribution;
4. phonological accounts which do not rule out the possibility of rhoticity and *r*-sandhi being in parallel distribution.

Chapter 3 deals with existing dialectological literature on the extent of rhoticity in Lancashire and explores existing literature on the geography and social history of the area. The chapter ends with a discussion of what the significance of East Lancashire data would be for the various phonological accounts reviewed in Chapter 2, and considers the importance of empirical data in evaluating phonological analyses.

The next two chapters are specifically focussed on the empirical research project I carried out in East Lancashire. Chapter 4 details the means by which I collected data. This includes the structure of the data collection, including the design of elicitation tasks, as well as the selection of participants and technical issues involved in making the recordings. The chapter also explains the post-interview procedures of data cataloguing and the method of transcription used. Chapter 5 presents detailed breakdowns of the results for each speaker and mean results for categories of

speaker according to the social factors of place and age, as well as linguistic factors such as the nature of the preceding and following segments, and in the case of data from my elicitation task (see Section 4.2), the nature of the suffix that led to an *r*-sandhi context. The first set of research questions that are specifically focused on the extent of rhoticity and *r*-sandhi in East Lancashire are answered in this chapter: RQ1, RQ2, RQ3 and RQ4. These questions can be answered quantitatively from the data and provide the foundations for the remaining more discursive questions.

The next three chapters discuss the relevance of my results for modelling language variation and phonological systems. Chapter 6 explores the implications of my results for dialectology and sociolinguistics and addresses RQ5. Chapter 7 explores the implications of my results for theories of phonology and is focused on RQ6. Chapter 8 argues that a sociophonological approach is the most convincing means of dealing with my results and answers RQ7. Finally, Chapter 9 summarises my findings and suggests possible future research.

Chapter 2

Phonological accounts of *r*-sandhi in English

In the literature on the phonology of English, widespread coverage is given to the phenomenon of *r*-sandhi[1]; indeed, Foulkes writes that '[ɹ]-sandhi is one of the most widely discussed consonantal topics in studies of British English' (1997: 261). This discussion often takes the form of a brief description of some widely-accepted observations of *r*-sandhi in non-rhotic accents of English (typically with a focus on RP), followed by a theoretical explanation of that sandhi behaviour using whichever model of phonology the writer believes to give the best account of the data. Traditionally, these models are rule-based approaches involving either /ɹ/-deletion or [ɹ]-insertion rules; since the early 1990s there have also been accounts of *r*-sandhi that use Particle Phonology, Government Phonology and Optimality Theory. Few accounts are based on corpus data (Foulkes 1997 is an exception); most seem to be based on assertions about *r*-sandhi in RP that are either down to speaker-intuition on the part of the phonologist or are based on descriptive accounts of RP such as Cruttenden (2001) or descriptions of accents of English more generally such as Wells (1982). Foulkes mentions that corpus-based approaches can reveal phonological patterns 'which lie beyond the scope of methods based on unsystematic

1. The phonetic realisation of /ɹ/ in the examples being discussed is not of central importance to much of this discussion (although the fact that the typical RP (and East Lancashire) realisation, [ɹ], shares many phonetic features with schwa will be important in some of the arguments discussed). Different writers use different conventions for labelling *r*-sandhi. Some use [ɹ]-sandhi, usually with a note that [ɹ] is used as a 'shorthand for the possible realisations of /ɹ/ found across the accents of English' (McMahon 2000: 232). Some, such as Carr (1999), use [ɹ]-sandhi, which focuses on one phonetic realisation, but also implies through the use of phonetic brackets [ ] that this is a phonetic rather than phonological issue. Hay & Sudbury (2005) use /ɹ/-sandhi, which implies that this process involves an underlying /ɹ/, a view not shared in all accounts. In this thesis I use *r*-sandhi. This notation avoids raising the issue of the phonological level at which the *r* fits in the various theoretical frameworks used by different phonologists, which is a key point to be addressed in this discussion. It would be unfortunate if a notation such as '/ɹ/-sandhi' were used in part of the discussion which dealt with 'insertion' models of *r*-sandhi where there is assumed to be no underlying /ɹ/ in the contexts in question. Use of *r*-sandhi allows for consistency no matter which theoretical model is being discussed. Where I am specifically making a point connected to the level of phonological structure I will use notations such as '/ɹ/-deletion' or 'the phonetic surface form [ɹ]', and I will, of course, preserve writers' own notation in quotations from their work.

and unaccountable observation, in turn facilitating evaluation of competing theoretical analyses' (1997: 260). His discussion of sociolinguistic variation in *r*-sandhi in Tyneside English is an interesting case in point, as is Hay and Sudbury's (2005) discussion of New Zealand corpus data, which will be discussed in Section 2.5.1 below. However, an investigative method based on use of corpora can present difficulties of its own: the corpus data may not cover all relevant environments for the phenomenon under investigation (a significant issue when considering low-frequency phenomena such as intrusive-*r* in English); there may be performance errors in the corpus data. Again, in an analysis of comparatively low frequency phenomena, dealing with potential performance errors could pose major methodological and theoretical problems: the criteria for deciding that a given utterance is a performance error are potentially open to question, and if the numbers of tokens are small anyway, discounting some tokens may have a large effect on the results of the investigation. These issues aside, however, the basic pattern of *r*-sandhi in non-rhotic varieties such as RP is attested in many descriptions of these varieties of English, and is fairly uncontroversial.

A key point here is that most accounts of *r*-sandhi start with a set of observations about $r \sim \varnothing$ alternations in non-rhotic dialects (see Section 2.1) and propose a model that accounts for these facts. There has been much debate about which approach does this best (note Foulkes' comment above). No account that I have read takes as its starting point a set of data showing that a rhotic accent has intrusive-*r*, which is a feature of this study in relation to RQ4 ('Do rhoticity and *r*-sandhi overlap in their distribution?'). This imbalance in the literature is with good reason: as Uffmann succintly puts it, such a dialect is 'unattested' (2007: 468). There has, therefore, been no need to try to account for such a dialect. However, in accounting for the uncontroversial 'non-rhotic-and-*r*-intruding dialects', many theories touch on the issue of rhotic dialects. Some accounts explicitly state that the proposed model for explaining *r*-sandhi in non-rhotic dialects rules out the possibility of rhotic speakers having intrusive-*r* (e.g. Johansson 1973: 63, Giegerich 1999: 196, Kamińska 1995: 122–3). Others (including Harris 1994, Carr 1999 and Uffmann 2007) allow for the possibility that rhotic speakers could have intrusive-*r*, but in the light of the apparently unattested nature of such dialects, the possibility of rhotic speakers having intrusive-*r* is usually mentioned in a brief aside from the main discussion of non-rhotic dialects. Given that this study presents evidence that some rhotic speakers can

produce intrusive-*r*, it is important to consider existing accounts of *r*-sandhi in order to explore how these particular rhotic speakers fit (or do not fit) into existing models of phonology.

This chapter briefly outlines the typical descriptions of *r*-sandhi taken as a starting point in most phonological discussions of the phenomenon. Accounts of the diachronic development of *r*-sandhi will be discussed in Section 2.2, as these are important for a central issue of this thesis: the relationship between loss of rhoticity and development of *r*-sandhi. Certain possibilities for dialectal variation in *r*-sandhi will be raised. Then a range of phonological models of *r*-sandhi will be discussed according to their predictions about this relationship. Section 2.3 discusses those theories which predict that rhoticity and *r*-sandhi are in complementary distribution; Section 2.4 discusses theories which allow for the possibility of rhotic speakers producing tokens of *r*-sandhi; Section 2.5 discusses a usage-based model of phonology which explicitly predicts that variable *r*-sandhi will develop before rhoticity has been lost, and that it is not only possible for the two phenomena to overlap, but that this overlap is a necessary feature of the development of *r*-sandhi.

2.1 Descriptive accounts of *r*-sandhi

I have mentioned (p. 15 n.1) my attempt to avoid implying aspects of analysis in my label for *r*-sandhi. Similarly, defining what is meant by the terms 'rhotic' and 'non-rhotic' (key concepts for this research project) entails some phonological assumptions concerning syllable structure: for example, Carr states 'non-rhotic accents do not allow /ɹ/ in rhymes . . . rhotic accents . . . do' (1999: 119). Foulkes' description refers simply to the following segment rather than to syllable structure: 'in "non-rhotic" varieties of English [r] can only be realised before a vowel' (1997: 260). Whichever phrasing is used, one feature of non-rhotic accents of English is that words that historically ended with a syllable coda /r/, realised as a surface form such as [ɹ], are now realised with a final schwa or with another non-high vowel when they are followed by a consonant-initial word or a pause. This means that, in RP, *near* is realised [nɪə], *lore* [lɔː] and *square* [skwɛə] (or [skwɛː] in more recent, less conservative varieties of RP (see Giegerich 1999: 199)). In connected speech, it is common to find pairs of examples such as *near the* [nɪəðə] and *near a* [nɪəɹə]. It seems apparent that the conditioning factor leading to the production of [ɹ] in a non-rhotic variety is the syllabic position available for it, which can be diagnosed by looking at the following segment. If a word such as *near*, which contains a word-final orthographic ⟨r⟩, is followed by a vowel, then [ɹ] is produced because it can fill a syllable onset position; if it is

followed by a consonant or a pause then no [ɹ] is produced; there is no available onset position for it to occupy. The *r* realisation of this $r \sim \varnothing$ alternation is typically labelled 'linking-*r*': in filling the onset of the next syllable it effectively 'links' the syllables. However, in many words a final [ə] or other non-high vowel does not reflect an historical /r/. Despite this different etymology, synchronically there is no phonological distinction between those final segments that reflect an historical /r/ and those which do not. This leads to the production of [ɹ] where it was not historically present, the phenomenon labelled 'intrusive-*r*', so that a phrase such as *law and order* is pronounced [lɔːɹənɔːdə]. Non-rhoticity in a dialect leads to homophony in certain pairs of words, so that, for example, *law* [lɔː] = *lore* [lɔː]. In precisely those pairs of words, the presence of intrusive-*r* means that they are still homophonous[2] when followed by a vowel-initial word: this homophony is summarised in (2:1).

(2:1)

Linking-*r*			**Intrusive-*r***	
tuner is	[tjuːnəɹɪz]	=	*tuna is*	[tjuːnəɹɪz]
spar is	[spɑːɹɪz]	=	*spa is*	[spɑːɹɪz]
lore is	[lɔːɹɪz]	=	*law is*	[lɔːɹɪz]
Laura Norder	[lɔːɹənɔːdə]	=	*law and order*	[lɔːɹənɔːdə]
**droaring*	[drɔɹɪŋ]	=	*drawing*	[drɔɹɪŋ]

Although the form *droaring* is not a word in English, I have found one instance of it in a pun (see Figure 2.1). (2:1) shows that the vowels that trigger RP *r*-sandhi are [ə, ɔ, ɑ]: non-high vowels. Intrusion of [ɹ] is considered to be stigmatised by some speakers, particularly of 'speech-conscious adoptive RP' (see Wells 1982: 285). Furthermore, Wells claims it is most stigmatised after [ɔ] 'due no doubt partly to the fact that it constitutes a more recent development (since *manna–manner*, *Korea–career*, *Ma–mar* became homophonous before *law–lore* did)' (1982: 225). This explains why newsreaders' *r*-intrusion in the phrase *law and order* to produce 'Laura Norder' has traditionally often been criticised by listeners to BBC radio. Indeed, in the BBC's own style guide, Allen (2003) gives some interesting instructions to BBC

2. Some accounts argue the *r* resulting from sandhi is different from an *r* in onset position: Cruttenden (2001: 289) notes a phonetic difference between *more ice* /mɔːr ˈaɪs/ and *more rice* /mɔː ˈraɪs/, and argues that the linking-*r* 'closes the syllable rather than being initial in the next'. However, when comparing linking and intrusive-*r* a more useful comparison would be *lore ice* versus *law ice*: these would be surface-identical, even if, as Cruttenden argues, the *r*s are syllable final rather than being in onset position. The mechanism by which RP speakers are able to have these, and only these, *r*s in syllable coda position, is not explained by Cruttenden.

news readers: 'Read what you have written with your mouth as well as your eyes. And pay attention. Speak properly. Some common words are regularly mispronounced' (2003: 64). He goes on to list examples which are 'often heard on our output ... **Seckertry** (secretary), **Nucular** (nuclear), **Vunnerable** (vulnerable), **Drawring** (drawing), **Joolry** (jewellery), **Febbery** (February), **Ecksettera** (etcetera), **Laura Norder** (law and order)' (2003: 64). The examples he gives of intrusive-*r* are both in contexts following /ɔ/, supporting Wells' claim that intrusive-*r* after this vowel is particularly stigmatised (Allen does not give ⟨Indiar and Pakistan⟩ as one of his examples, for instance). It is also interesting that the letter ⟨r⟩ is used to signal a phonetic [ɹ] in ⟨Drawring⟩, but in ⟨Seckertry⟩ the first ⟨r⟩ suggests a simplification of the consonant cluster in the onset of the second syllable to give [sɛkətɹi], rather than some sort of hyper-rhotic [sɛkəɹtɹi]. Although the shibboleths pointed out by Allen suggest that BBC news readers will be using RP, there are now several several news readers with Scottish Standard English accents, even on Radio 4: it would be interesting to see whether the style guide changes in the future. It is also worth noting that the BBC, being such a large organisation, also publishes documents which take a different view of language use from the 'speak properly' of Allen's style guide. On one page on the BBC Voices website there is a discussion of intrusive-*r* which describes a 'subtle change in what people say' (BBC Voices 2007), but does not contain the prescriptive instructions of the BBC News Styleguide.

There is evidence that for some speakers, 'linking and intrusive [ɹ] are disfavoured by another [ɹ] in the immediate environment, as in *the emperor of Japan*' (McMahon 2000: 244).[3] In addition, there is some descriptive evidence that *r*-intrusion at morpheme boundaries is, for some speakers, more stigmatised than at word boundaries. Cruttenden (2001: 289) presents a graded hierarchy of the likelihood of RP speakers realising *r*-sandhi in various contexts; intrusive-*r* before a suffix is 'often strongly stigmatized'. Speakers for whom this is true are able, by some means or other, to avoid *r*-intrusion in e.g. *drawing*, whereas they might be more likely to have intrusive-*r* in *draw*[ɹ] *a picture* (and much more likely to have it in *tuna*[ɹ] *is* as suggested by Wells above in his comment about /ɔ/ compared to /ɑ/ or /ə/, and by Cruttenden in his hierarchy of *r*-sandhi). Examples of the variability with which some speakers demonstrate

3. I find the intrusive-*r* to be very noticeable in British television adverts for Wrigley's *Extra Ice Gum*, in which a northern English speaker pronounces the name of the product as [ˈɛkstɹəˈɹaɪsˈgʊm]. Although carrying out this research has made it difficult to be objective about my own production of *r*-sandhi, I tend to produce linking or intrusive-*r* after most instances of schwa that arise in a sandhi context, but I do not think that I have intrusive-*r* in a phrase such as *Extra Ice Gum*, and perhaps this is indeed due to the presence of another [ɹ] near to the sandhi environment.

intrusive-*r* are easy to find. For example, in a recent radio discussion of crime in the United Kingdom[4] , the presenter, Mark Easton, did not have *r*-intrusion in the phrase *law and order*, which, as mentioned in Allen (2003), is a well-known shibboleth, and, given the subject matter of the programme, occurred repeatedly in the broadcast. However, he had *r*-intrusion in the phrase *Jack Straw*[ɹ] *argued*, perhaps suggesting that he was modifying his phonology in the stock phrase *law and order* due to high awareness of it as a shibboleth, or suggesting that the phrase is stored as a unit. In less frequently occurring collocations, such as *Jack Straw argued*, automatic phonological processes led to the realisation of intrusive-*r*.

Spellings that apparently indicate *r*-intrusion are not necessarily evidence of it. Figure 2.1 shows the winning entry of a children's art competition at Edinburgh Zoo, organised by a Scottish newspaper, the *Daily Record*. The title of the competition involves the use of the spelling ⟨droaring⟩ as a pun (the competition was to draw a lion). Of course, given that most of the entrants are likely to be rhotic, most phonological accounts of *r*-sandhi would predict that these rhotic speakers would never pronounce *drawing* as 'droaring'. This poster, therefore, provides evidence of a pun, rather than evidence of Edinburgh speakers' phonological systems. Nonetheless, it is interesting that such a pun is apparently still effective in an area where most speakers are rhotic, and that puns can work even when they do not reflect the phonological systems of their target audience.[5] This matches comments made in the literature about the salience of intrusive-*r* for rhotic speakers who do not produce it, but are aware that other people do: '[o]ne can, for example, hear Scots ask "Why do English people say Canadarr?"' (Trudgill 2000: 58).

2.2 Diachronic accounts of the development of *r*-sandhi

2.2.1 Dialect data from varieties of English and their implications for phonological accounts of r*-sandhi*

One of the *a priori* assumptions made in several phonological accounts of *r*-sandhi is that a variety must be non-rhotic in order for intrusive-*r* to develop. Uffman's discussion of the diachrony of intrusive-*r* is a summary of the standard diachronic account as found in many

4. *The Crime Of Our Lives*, BBC Radio 4, 9 August 2007.

5. Another (non-*r* related) example of this is the current advertising campaign slogan for the Co-op supermarket. In most of the advertisements, the slogan *Good with food* is read by a Scottish speaker as [gud wɪð fud]: the words rhyme. In a recent version of the television advertisement, a speaker with an English accent reads the slogan as [gʊd wɪð fuːd] which clearly lacks the rhyme typically associated with memorable slogans–all that remains is the on-screen orthographic link of the ⟨oo⟩ spellings.

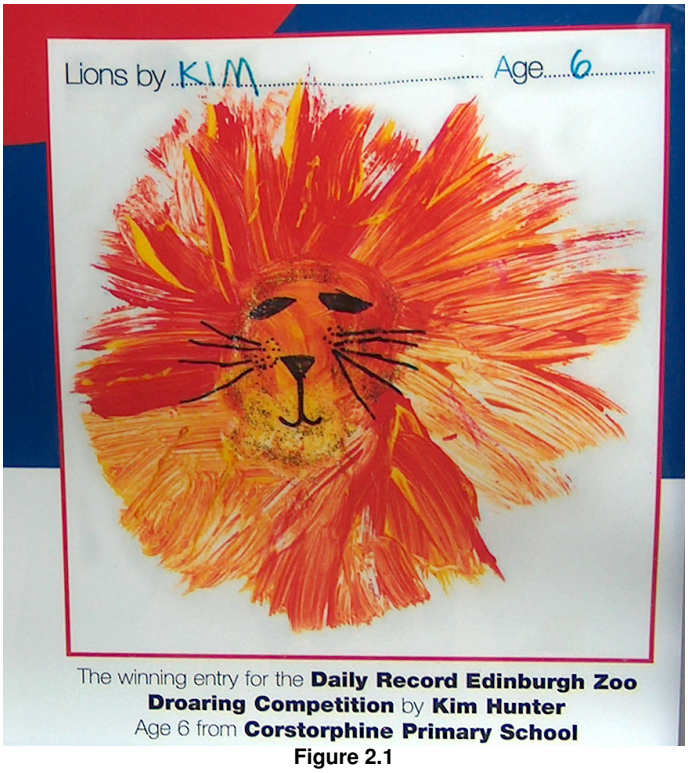


Figure 2.1
A poster at Edinburgh Zoo, including the pun 'droaring', June 2007.

phonological texts concerned with *r*-sandhi: a loss of rhoticity is followed by reanalysis, so that 'the occurrence of [r] between vowels is overgeneralised to all contexts in which linking [r] can appear (that is, the set of non-high vowels)' (2007: 452). Given this account of the diachronic development of intrusive-*r*, Giegerich's comment that 'there are no rhotic speakers that have intrusive [r]' (1999: 178) seems perfectly logical: loss of rhoticity is a necessary precursor to the reanalysis that leads to *r* intrusion.

This key assumption that 'both linking and intrusion are systematically confined to non-rhotic varieties of English' (Giegerich 1999: 169) is in line with much of the literature. For example, in Harris' discussion of four types of accents with regard to their production of *r*, his rhotic accent A, 'the basic rhotic type . . . well established in Canada, Ireland, Scotland, most of the United States and parts of the Caribbean' (1994: 232) does not have intrusive-*r*. Carr, on the other hand, states that 'there is no reason why [intrusive-*r*] should not spread to rhotic accents' (1999: 127). In fact, Harris himself writes that 'it would not be surprising to discover cases of intrusive *r* in **rhotic** dialects' (1994: 253). Despite this, Harris does not give any specific present-day examples of such dialects (although see Section 2.2.2 below), and, as mentioned above, his 'Dialect A' is rhotic and does not have intrusive-*r*. Cruttenden states that 'in those

regions where post-vocalic /ɹ/ is pronounced and *pour*, *paw* are identified as separate word forms in isolation, the tendency to introduce intrusive /ɹ/'s is less marked than in RP or in RP-influenced types of speech' (2001: 289). This description implies an inherent variability in intrusive-*r* by using the terms 'tendency' and 'less-marked'. Although rhotic speakers are claimed to be less likely to introduce intrusive-*r*, it is not claimed that there is a systemic ban on their doing so. Clearly, if intrusive-*r* is to be found in some rhotic varieties, then this casts doubt on the proposed systematic link with non-rhoticity.

Linking-*r* is restricted to non-rhotic varieties: rhotic speakers would be producing surface [ɹ] in the relevant words whether or not a vowel followed: there is no $r \sim \varnothing$ alternation for rhotic speakers. However, there is an issue of whether intrusive-*r* is similarly confined to non-rhotic varieties. An account which depends on analogy between etymologically *r*-less and *r*-ful words for the actuation of an intrusive-*r* process would mean that rhotic speakers would never start to produce intrusive-*r*. Furthermore, an account which proposes that the *r*-sandhi triggering vowels are stored in such a way that a surface [ɹ] is an allophonic realisation of part of the underlying vowel (see Giegerich 1999) effectively bans rhotic speakers from producing intrusive-*r*: rhotic speakers have different underlying representations for these vowels.

Two possibilities for finding rhotic varieties where *r*-intrusion does occur are: (a) to find historical evidence of intrusive-*r* from a period before the loss of rhoticity in a variety of English that is now non-rhotic, (or indeed to find historical evidence of intrusive-*r* in a variety that has remained rhotic), and (b) to find evidence of intrusive-*r* in a contemporary rhotic variety of English (or at least a variety that was rhotic sufficiently recently for recordings to have been made). Clearly (b) would allow for a great deal of detailed analysis, including perhaps instrumental phonetic analysis, whereas (a) would by definition be dependent on accuracy of observation by writers of the time. Both types of evidence would be useful though, and both types are discussed in the literature on *r*-sandhi.

2.2.2 Historical evidence from varieties of British English: r*-sandhi or hyper-rhoticity?*

Harris' argument for treating *r* as a 'floating sound' (see Section 2.4.2 below) includes an 'Historical interlude' (1994: 252–254), in which he mentions some historical descriptions of *r* in London English. He writes that 'a generation before John Walker's description of smooth versus rough *r*, Thomas Sheridan was castigating Londoners for inserting *r* after the final ⟨-a⟩-vowel of words such as ⟨Belinda⟩ and ⟨Dorlinda⟩' (1994: 253). He also claims that 'there

is plenty of evidence of intrusive *r* in rhotic dialects, past and present, where it is most widely reported in final unstressed position' (1994: 253). This last claim refers to what is often labelled 'hyper-rhoticity' (Wells 1982: 221–2, 343), which is a different phenomenon from intrusive-*r*, because it can occur 'not only when the following word begins with a vowel, as in the "intrusive /r/ " of RP, but in any environment' (Wells 1982: 343). Indeed, Hay and Sudbury do not include such instances of *r* in the data set for their discussion of the emergence of *r*-sandhi in New Zealand English (see Section 2.5.1). They explain that, in forms such as 'yeller' for *yellow*, 'the "intrusive *r*" does not then intrude because the speaker makes up an *r* insertion rule. Instead, the *r* appears by analysis, when speakers assume that, because some final schwas represent /r/s, other final schwas do as well' (Hay & Sudbury 2005: 800). This argument is actually very similar to Harris' floating *r* argument about the development of intrusive-*r*. Britton (2007) showed that many historical sources of dialect data contain examples which have often been interpreted as being evidence of a loss of rhoticity. These include homophone lists with pairs such as *pillars* and *pillows*, and respellings such as *aie-re-ur* 'area', *enigmer* 'enigma' and *shadder* 'shadow' (Britton 2007: 529). Britton argues that, rather than reflecting a loss of rhoticity, these examples could be evidence of hyper-rhotic realisations of the words that did not historically end with /r/. Furthermore, data from the *Survey of English Dialects* suggests that hyper-rhotic realisations are found in the most strongly rhotic dialect areas. This is interesting when compared to discussions of the emergence of *r*-intrusion. There is the matter of defining the terms 'hyper-rhoticity' and '*r*-intrusion': while there are arguments for treating them as separate processes because hyper-rhotic realisations can occur in contexts where *r*-intrusion is not found, there does seem to be a similarity in their effects. Harris argues (see Section 2.4.2 below) that this reflects a similarity in the lexical representations: a floating *r* can account for both phenomena). Certainly, a pronunciation such as [ɪnɪgməɪ] could result from either process. It is interesting that hyper-rhoticity is apparently found in strongly rhotic areas, whereas *r*-intrusion is often claimed to require non-rhoticity in order for it to occur.

In terms of phonological explanations, the interpretation of a form such as [ɪnɪgməɪ] would very much depend on the whole set of data. If realisations ending in [ɪ] were found consistently, in both pre-vocalic and non-prevocalic contexts, then it could be argued that the lexical underlying representation of the word has changed, and that this is not evidence of a productive *r*-sandhi process (this is often claimed for the word *idea* for some speakers of Scottish Standard English).

However, if in a corpus of data there were variation in the realisation of a word such as *enigma*, with both (hyper)rhotic and non-rhotic forms present, then the theoretical modelling would be problematic. Hay & Sudbury (2005) do not discuss the hyper-rhotic pronunciations in their New Zealand data, concentrating on examples that are found in sandhi environments only. They also excluded potential pronunciations with [ɹ] epenthesis in morpheme-internal environments, such as *cloth* [klɒɹθ] (Wells 1982: 522), writing that 'it is unclear whether such cases of internal /r/-epenthesis are directly related to ... /r/-sandhi phenomena' (Hay & Sudbury 2005: 800). However, I did look for evidence of hyper-rhoticity in present day (variably rhotic) Lancashire speech: collecting such data together with other data connected to rhoticity in Lancashire helps to begin to clarify the extent to which hyper-rhoticity and *r*-sandhi are or are not linked. As will be shown in Chapter 5, I found very little evidence of hyper-dialectal *r* in the speech I recorded.

2.3 Models which predict *r*-sandhi and rhoticity to be in complementary distribution

The above descriptions of linking and intrusive-*r* refer to the phonetic forms of certain phrases, as attested in many non-rhotic accents of English, but in the case of my description of intrusive-*r*, some reference was made to phonological matters. Most phonological theories are based on the idea that there is an underlying form which is stored in the mind, and a surface form that is derived (or arrived at in some way), which can then be realised by the vocal apparatus as a phonetic form (Lass 1984: 17). An exception to this standard view would be an entirely exemplar-based model, in which every instance of a form that is heard is stored in the mind. Pierrehumbert (2006: 522) notes that under the strongest form of an exemplar theory, 'the phonological principle would not be in force ... instead, each word would be an individual point somewhere in phonetic hyperspace'. However, even under a strong exemplar theory, there would be some kind of 'averaging' process, involving a degree of abstraction from the stored forms, when it comes to a speaker actually producing a form.

Several phonological approaches can be taken in order to explain the phenomena of linking and intrusive-*r*. Some examples are: /r/ is stored in the underlying form and there is a deletion rule in order to produce the *r*-less surface form (e.g. Heselwood 2006); /r/ is not stored in the underlying form and surface forms containing [ɹ] result from an insertion rule (e.g. Carr 1999); /r/ should be treated as a 'floating sound' which is 'phonetically uninterpretable' (Harris 1994: 230) unless it is licensed to occupy a timing slot and therefore can be phonetically realised;

an infinite number of possible forms are generated from the underlying form, and a ranking of constraints should lead to the phonetic realisation of both linking and intrusive-*r*[6] (e.g. Uffmann 2007). I will consider each of these analyses in turn.

2.3.1 The underlying-/r/ model

This model would suggest that words with historical coda /r/ still have that /ɹ/ in their underlying representation even for non-rhotic speakers, and that these speakers do not realise the /ɹ/ unless the following segment is a vowel. For the moment, I am going to assume that schwa is present in the underlying representation (UR)[7], so *water* could have the phonological representation /wɔːtər/, which when not followed by a vowel would be realised as [wɔːtə], and *water of (Leith)* could have the underlying representation /wɔːtər ɒv/, which would be realised as [wɔːtəɹɒv]. The issue, then, is accounting for when the /ɹ/ is not present in the surface form.

According to this model, /ɹ/ is only realised when it can surface before a vowel. In other positions, it is deleted according to a simple phonological rule such as /ɹ/→∅. Clearly, there are some words in which such an underlying /ɹ/ can never occur before a vowel, such as *card* or *farm*. In his introductory textbook treatment of phonology, Carr simply states that such an instance of /ɹ/ 'never gets realised' (Carr 1999: 124). However, words such as these can pose a problem for the underlying /ɹ/ model, which will be discussed in Section 2.3.1.1 below. That aside, the /ɹ/ deletion model explains the distribution of [ɹ] that is observed in many non-rhotic accents. It does not quite explain all non-rhotic accents; in South African English varieties, for example, linking-*r* and intrusive-*r* are not found: *air of* would be realised as [ɛə ɒv] (with a hiatus) or [ɛəʔɒv] (with a glottal stop intervocalically): 'constricted *r* fails to appear morpheme finally and is confined to foot-initial onsets' (Harris 1994: 234).[8] The fact that some non-rhotic accents do not show linking-*r* even when there is a following vowel adds another layer of complexity that must be accounted for, and issues arising from dialectal variation will be discussed in Section 2.2.1 below.

6. This is the approach taken in Optimality Theory, and, interestingly, given the principle of Richness of the Base, it should not matter what the underlying input form is: 'whatever the input is, the constraint ranking alone should be able to transform it into a well-formed output' (Uffmann 2007: 455). As the issue of whether or not an /ɹ/ is present in the underlying representation is a key issue in the other phonological accounts I listed, OT clearly takes a radically different approach. This will be discussed in Section 2.4.3 below.

7. This assumption will be challenged by various theories to be discussed later, including in Section 2.3.1.1.

8. This raises the question of how the phonological foot is to be defined: constricted *r* can occur in word-initial unstressed syllables, e.g. *receive* and these are not argued to be foot-initial in, for instance, Giegerich (1992: 264–272).

Heselwood (2006) argues for a version of the underlying-/ɹ/ model which analyses word-final schwa as an allophone of /ɹ/ in RP. Using the system of standard lexical sets (Wells 1982), Heselwood argues that that there has been a merger of *lett*ER and *comm*A: both sets are realised with a schwa in pre-pausal and preconsonantal contexts, but with a linking or intrusive-*r* in prevocalic contexts. Heselwood uses the fact that final schwa and [ɹ] are phonetically very similar and have a complementary distribution to support the idea that both are allophones of an underlying /ɹ/. There are some examples where [əɹ] and [ɹ] can occur in the same context in apparently free variation, such as *watering* or *vodka and lime*. However, 'where there is parallel distribution there is no lexical-phonological opposition' (Heselwood 2006: 85). Indeed, Heselwood specifically mentions that examples such as *watering* [wɔːtɪɪŋ], which lack a schwa component, make the term 'linking-*r*' problematic because the [ɹ] is not actually linking two vowels (at least on the surface) and this 'strongly suggests that /ɹ/ is part of the phonological form of the stem' (2006: 87–8). He dismisses accounts of *watering* [wɔːtɪɪŋ] that suggest an *r*-insertion rule followed by a schwa-deletion rule because for *lett*ER words these pronunciations 'must have continuously existed since before the transition to non-rhoticity. It is not only implausible but needless to claim that at some arbitrary point in time speakers had to develop a rule of R-insertion to keep doing what they had always been doing anyway' (2006: 88). This discrepancy raises the question of whether a non-rhotic speaker who realises *watering* as [wɔːtɪɪŋ] really is doing the same thing as a rhotic speaker who realises the same surface form. Given that these two speakers would have different surface forms for *water*, and, depending on the model, possibly different underlying representations too, it could be argued that they undergo different processes in order to arrive at the same surface form for *watering*, assuming that they derive this from {water} + {ing} and do not store {watering} as a single lexicalised morpheme.

Whatever the implications of Heselwood's argument, Giegerich notes a similar possible argument that 'in the development of non-rhoticity, prevocalic [r] in *hearing*, *hairy* has simply been retained' (1999: 169). However, he points out that the fact that *r*-sandhi occurs not only within words but also between words suggests that it is 'a postlexical regularity in present-day RP whose "across the board" occurrence demands acknowledgement as a fully productive process. This is clearly not just detritus from a past change' (1999: 169). Giegerich goes on to claim that an argument based on the idea of the continuous presence of certain instances of prevocalic *r* during the loss of rhoticity effectively denies *r*-sandhi 'the status of a regularity in

the synchronic phonology that is worth explaining' (Giegerich 1999: 169). In putting forward his argument about *watering*, Heselwood presumably does not want to deny *r*-sandhi such a status. Perhaps his argument is that because prevocalic pronunciations have not changed since before the transition to non-rhoticity, an underlying-/ɹ/ analysis is more plausible than an *r*-insertion model. Heselwood's argument, then, is that [ɹ], [əɹ] and [ə] are all allophones of /ɹ/.

2.3.1.1 Problems with the underlying-/r/ model

One problem for the underlying-/ɹ/ model concerns positing an underlying representation for words in which a coda /ɹ/ never surfaces, as in Carr's simplified account of a possible /ɹ/-deletion model (1999: 124). In the case of a pair such as *car* and *card*, it may be possible to have an /ɹ/-ful underlying form for words which alternate and an /ɹ/-less underlying form for non-alternating words: /kɑɹ/ versus /kɑːd/. This does raise the issue of the nature of the preceding vowel though: is it phonemically long /ɑː/ or short /ɑ/? The underlying form of what surface as centring diphthongs in RP is also a potential problem. In a word such as *weir* [wɪə], according to the underlying-/ɹ/ model, RP speakers derive the centring diphthong from an UR of /wiːɹ/ (or even possibly a lower vowel if a Vowel Shift rule is assumed to be operating synchronically). In *weird* [wɪəd] the centring diphthong is still derived from a long-vowel-plus-/ɹ/ sequence, /wiːɹd/, but the /ɹ/ never surfaces. The issue of such 'free-ride' derivations has been widely discussed (e.g. McMahon 2000). The idea of positing an underlying segment that never surfaces is problematic. Giegerich points out that this abstractness poses difficulties for modelling the learnability of the language: 'there is no independent evidence for /ɹ/ being synchronically present, in RP, in non-alternating forms like *weird*' (1999: 176).

A version of the underlying /ɹ/ model could have /ɹ/-less underlying representations of some historical coda /ɹ/ words such as *card*, in order to avoid issues of abstractness and learnability. So *card* would be represented underlyingly as /kɑːd/ because it never surfaces with an [ɹ]. This representation would avoid abstractness problems, but would mean that words such as *car* and *card* were treated differently phonologically. While this may be justified because *car* can alternate between final [ɹ] and ∅ while *card* cannot, it does mean that this model needs to have different systems of URs for certain words which have 'really' lost their /ɹ/ from those which have 'lost' the *r* only when they occur non-prevocallicaly. This explanation is different from Carr's above, which proposes that *card* or *farm* do have /ɹ/ in their URs, which never surfaces. In contrast, a model which inserts /ɹ/ could have consistent URs for words such as *car* and

card but account for the [ɹ] ∼ ∅ alternation in *car* in terms of rules used in its phonological derivation. Heselwood acknowledges this issue, and takes it even further, arguing that 'speakers may well have multiple representations for what is considered a single lexical item' (2006: 89). He goes on to claim that 'it is likely that a word such as *visa* has the representation [viːzə] for contexts not containing a following vowel (and optionally for contexts that do), and the representation [viːzəɹ] only for contexts where there is a following vowel, e.g. *visa*[r] *application*' (2006: 89). It is not entirely clear what sort of representation Heselwood means here; he has chosen to use square brackets rather than traditional slanted phonemic brackets, presumably because he has just argued that the multiple representations of seemingly single lexical items are 'more akin to a set of context-sensitive allophonic transcriptions than a single abstract phonemic one' (2006: 89). However, this approach to phonology does raise the question of where to stop, and why one should stop at the level of individual words: if it is argued that *visa* is stored as several separate representations, why not argue that whole phrases are stored (*visa application* etc.), or clauses or whole sentences? In addition, the frequency of various collocations could well be involved: compare (2:2) and (2:3):

(2:2) [fake[visa application]]

(2:3) [[fake visa] industry]

If these occur at different frequencies, it might be expected, for instance, that there could be more processing involved in (2:3), and this could affect the likelihood of intrusive-*r* production.

An issue with the simple account of an underlying /r/ that can be realised only when it is in onset position is the matter of how phonological segments should be syllabified. This model assumes that word final consonants such as the /r/ in /wiːr/ are analysed as being in coda position. However, in Government Phonology it is necessary to analyse word-final consonants as being syllabified in the onset of a 'degenerate syllable' (Harris 1994: 74) with no audible nucleus. In this analysis, the /r/ would be in onset position, yet it is not realised in the surface form. A different generalisation would have to be made: an underlying /r/ could be realised only if followed by a filled nucleus, and would not be realised if followed by an empty nucleus. That is a fairly straightforward matter of reformulating the rules to conform to the phonological model, and does not pose a problem for the idea of underlying /r/.

The underlying-/r/ model seems problematic, though, when applied to examples of intrusive-*r*. Given that words such as *draw* may be realised with [r] when followed by a word with

an empty onset, so that *draw a* would be [dɹɔːɹə], this model requires underlying forms such as /drɔr/ (Carr 1999: 125). Although such underlying representations seem 'grossly counter-intuitive' (Pullum 1976: 91), they are not in themselves an argument against an underlying /r/: for speakers with intrusive-*r*, words with orthographic and etymological ⟨r⟩ behave in the same way as words without orthographic/etymological ⟨r⟩. In a discussion of final schwa, Heselwood argues that the same synchronic analysis must apply to '*all* word-form final schwas' (2006: 79) regardless of their historical origin. So, in the case of words such as *comma* that historically did not contain /r/, there must at some point have been a change in the underlying representation so that speakers acquired underlying forms which did contain /r/. This would be a case of reanalysis.

In itself the argument that both sets of words have underlying /r/ seems as justifiable as an argument in which neither set of words has an underlying /r/. Carr gives examples of some English speakers' pronunciations of foreign languages, so that *déjà ici* is pronounced [deɪʒɑːɹɪːsɪː] (1999: 126), and describes the idea that English speakers store the French word *déjà* with an /r/ in the final syllable as 'somewhat implausible' (1999: 127). Pullum labels the production of a surface intrusive-*r* in 'foreign' words spoken by English speakers as 'a mystery under the underlying r hypothesis' (1976: 91). However, it is no less plausible to suggest /deʒar/ as an UR than to suggest /drɔr/ as an UR, so again, in itself this is not really a convincing argument against an underlying /r/. There are better reasons to question the underlying /r/ model. Carr gives the example of certain words, such as *piano*, that end with /oʊ/ but that may, in fast speech especially, have their final syllable reduced to schwa. If the final vowel is reduced to schwa, then intrusive *r* appears; yet it clearly does not appear if the final syllable has a full vowel: *piano amazes* can be [pʰjænoʊəmeɪzɪz] or [pʰjænəɹəmeɪzɪz] (1999: 126). If there is to be an underlying /r/, there would need to be an explanation for why it does not surface when the final vowel is not reduced to schwa. Carr writes that there is 'no accounting' (1999: 126) for this, although Heselwood again argues that 'speakers may store [fɛlə] in addition to [fɛləʊ], selecting the one rather than the other to suit the extra-linguistic nature of the occasion, the schwa-final form being a member of the *lett*ER set but the other form not' (2006: 89). Even more problematic is the behaviour of *have* and *of*, which can in connected speech be pronounced as [ə] with elision of [v]. Carr writes that 'many people' (1999: 126) have intrusive-*r* when these reduced pronunciations are used and the following word starts with a vowel; he gives *should*

have eaten and *pint of Abott Ale* as examples. Presumably then, *pint of ale* would be realised [paɪntəɹeɪl]. Without corpus data, it is difficult to tell whether Carr is right that 'many people' would have intrusive-*r* in this example (and McCarthy (1993) uses data from Massachusetts English which shows that intrusive-*r* does not occur after reduced function words in that variety: in fact it is 'completely impossible' (1993: 173) in that context). However, in order to account for such speakers, Carr claims that an analysis with underlying /ɹ/ would have to represent *of* as /ɒɹv/ with 'the entirely arbitrary and rather bizarre proviso that the /ɹ/ is not deleted only if the /v/ *is* deleted and the vowel is reduced to schwa' (Carr 1999: 127).

One possible explanation would be that the function words mentioned by Carr have two forms, 'full' and 'reduced', to give, for instance, /ɒv/ and /ə/. Again, though, this raises the question of storage versus derivation, as Heselwood's idea of multiple URs does, and points towards usage or exemplar-based models. At their most extreme, these models could effectively deny any role for phonology (see Pierrehumbert 2006: §3, Bermúdez-Otero 2006: 15) because everything would be stored with no process of deriving or evaluating a surface form from an underlier; other versions of these models would have a balance between storage and phonological derivation (e.g. Pierrehumbert 2002). Whatever the effect of this wider consideration of phonological theory on the problem posed by full and reduced variants of *have* and *of*, I think it is fair to say that intrusive-*r* in these words is not as common as the other examples: Heselwood points out in a footnote that the *have/of* examples and the reduced forms of final /oʊ/ are found in 'some non-rhotic accents' (2006: 88) and so perhaps the 'bizarre' nature of an attempt to reconcile intrusive-*r* in *have/of* with an underlying-/ɹ/ model is not an issue for those (many?) speakers who do have intrusive-*r* but not in *have* or *of*. At any rate, it is interesting to pay careful attention to linguists' use of somewhat open terms such as 'some' or 'many'. In addition, of course, in this discussion of reduction to schwa, the problems caused by the presence of intrusive-*r* are a result of claiming that the schwa in the reduced form is present in the UR. If, as Heselwood implies, there are no word-final schwas in URs in English, then the reduction to schwa is actually a reduction to /ɹ/ , which can then be realised as a number of allophones: [ɹ], [əɹ] or [ə]. The nature of schwa and [ɹ] is addressed in Giegerich's model of *r*-sandhi using Lexical Phonology, which will be discussed below in Section 2.3.3. Giegerich's model also recognises [ə] and [ɹ] as ' "allophones" of the same underlier' (1999: 231), the difference is that Giegerich assumes this underlier to be a melodically empty /∅/.

So far, none of the objections to the 'underlying /ɹ/ ' model has convincingly undermined it. Nonetheless, linguists have reported other apparent problems with the underlying-/ɹ/ model, one of which is the ' "double R" objection' (Heselwood 2006: 87). This argument, put forward by Wells (1982: 45, 220), points out that if [ə] is an allophone of /ɹ/ , then [əɪ] would have to be a realisation of /ɪɹ/. Heselwood counters this observation by arguing that the schwa that arises from either pre-*r* breaking of long vowels or weakening of final /ɹ/ is a change of realisation of /ɹ/ rather than reflecting a change of phonemic structure, and as such the phonetic sequence [əɪ] is a realisation of underlying /ɹ/. He also points out that the schwa component is optional, to give for instance *better off* [bɛtɪɒf] (2006: 87). Presumably, the existence of such pronunciations is taken by Heselwood as evidence that the surface phonetics that lead to the 'double R' objection do not even arise in some cases. In the absence of corpus data, however, I think the frequency of occurrence of such pronunciations as [bɛtɪɒf] or *cash for honours* [kaʃfɪɒnəz] (Heselwood 2006: 87) is questionable.

If the implication that RP speakers developed an [ɪ]-insertion rule is arbitrary because they already had an [ɪ] in *lett*ER words in prevocalic contexts, then surely the suggestion that such speakers developed an underlying /ɹ/ and an /ɹ/-deletion rule in *comm*A words in prepausal or preconsonantal contexts is equally arbitrary: it is simply another case of reanalysis. It seems that the objection that such rules allow speakers 'to keep doing what they had always been doing anyway' (Heselwood 2006: 88) applies to both arguments. Of course, Heselwood would argue that the schwa at the end of *comm*A words is now a surface form of underlying /ɹ/ , so there is technically no /ɹ/-deletion, merely a context-conditioned allophonic realisation as schwa. However, this hypothetical change of underlying representation when the surface form (in non-prevocalic contexts) has remained constant has been argued to be problematic. One of the examples Heselwood gives is *vodka and lime* as [vɒdkɪənlaɪm], and Heselwood's argument suggests that the underlying representation of *vodka* is /vɒdkɹ/. This claim poses a similar problem to Carr's example of *déjà*: the idea of English speakers storing foreign words with non-etymological /ɹ/ has been labelled as implausible and counter-intuitive. On the other hand, it is well known that loan words may be adapted to fit the phonology of the borrowing language (e.g. Japanese speakers' schwa epenthesis to break up consonant clusters in English words), and Heselwood's model suggests that there simply are no word-final underlying schwas in RP: surface word-final schwas must be allophonic realisations of an underlying /ɹ/.

2.3.2 *The* ɹ*-insertion model*

This model, like the underlying-/ɹ/ model, suggests a merger of the *lett*ER and *comm*A sets, as well as loss of a contrast between /ɔɹ/ and /ɔ/ preconsonantally, and the same for /ɑɹ/ and /ɑ/. This loss of contrast involves a change in the underlying representations of members of one of the sets. However, this time the merger is in the direction of the set without a historical /ɹ/. In the case of *lett*ER and *comm*A, the merger is towards the *comm*A set: both sets are modelled with an underlying final schwa. A diachronic account of the origin of this merger is given by Wells (1982). This analysis suggests that once the /ɹ/ has been lost in coda position, both the *lett*ER and *comm*A sets end in an underlying schwa. The linking-*r* in words where final /ɹ/ was historically present is inserted in order to prevent a hiatus when a *lett*ER word is followed by a vowel initial word. Because the *comm*A set now has a phonemically identical ending (after the merger of the two sets), intrusive-*r* is inserted when *comm*A words are followed by vowel initial words.

Essentially, this model is very similar to the underlying-*r* model: it is in effect a mirror image of it. Both models involve a change of underlying representation for some words: for the underlying-/ɹ/ model this affects words with syllable-final /ə, ɔ, ɑ/; for the *r*-insertion model this affects words with coda /ɹ/. Both models involve rules to account for alternations involving the presence or absence of a phonetically realised surface [ɹ]. Carr states that there would be nothing to indicate which model was the correct one, were it not for the phenomenon of intrusive-*r*, which, he claims, rules out the underlying-/ɹ/ model, and leaves the *r*-insertion model as the more convincing approach (1999: 125). However, linguists have raised problems with the *r*-insertion model, and these are discussed below.

2.3.2.1 *Problems with the* ɹ*-insertion model*

While the loss of phonological coda /ɹ/ seems like a plausible account of the merger of the *lett*ER and *comm*A sets, the problem with this model is the insertion rule required to account for both linking and intrusive-*r*. Giegerich points out 'the arbitrariness that is inherent in all analyses that rely on the insertion of segments into strings' (1999: 184). Diachronic explanations that suggest that *lett*ER words continue to be pronounced with final [ɹ] when followed by a vowel-initial word (a word with an empty syllable onset) and that *comm*A words gain this final [ɹ] in the same contexts by analogy with *lett*ER words, seem logical. However, synchronically, the question of what was historically present in certain words seems unlikely to affect speakers'

phonological systems (apart from the special case of speakers who make a distinction between the *lett*ER and *comm*A sets, which Giegerich argues is not made on phonological grounds (1999: 283, and see also Section 2.3.3 below)).

Another problem is determining a natural class for the input vowels that trigger the insertion process. Giegerich (1999: 181) gives a basic version of a possible *r*-insertion rule, shown in (2:4).

(2:4) $$\varnothing \rightarrow [\text{ɹ}] \; / \; \left\{ \begin{array}{c} [\text{ə}] \\ [\text{ɜː}] \\ [\text{V ə}] \\ [\text{ɑː}] \\ [\text{ɔː}] \end{array} \right\} \_\_ \; \text{V}$$

This formulation of the rule has quite a disparate set of input vowels: schwa, [ɜː], centring diphthongs and low vowels. Giegerich's solution is to analyse all these vowels as having the same final component: this idea will be discussed in Section 2.3.3.2 below. For the moment, if it could be argued that the contexts for RP *r*-sandhi in (2:4) are in fact the same context, then it would seem that *r*-sandhi can be explained in terms of a simple insertion rule that applies in that single context. However, there is clearly some phonological abstraction involved in suggesting that surface forms phonetically realised as [ə, ɪə, ʊə, ɜ, ɔ, ɑ] all have a common final element in their URs (and this implies that surface forms such as [ɔ] and [ɑ] are to be treated as being underlyingly made up from two elements). It is not much more of an abstraction to suggest that the final underlying element that the contexts in (2:4) have in common is /ɹ/: if this is assumed then the same reduction to a single context now supports an underlying-/ɹ/ model. So far, then, there really does not seem to be a conclusive argument in favour of either of the rule-based approaches already discussed. The following sections discuss other approaches to the problem, beginning with an account that proposes that there is an underlier, but that this is an abstract underlier ∅, which is realised as either *r* or schwa depending on its position in the syllable.

2.3.3 A Lexical Phonology account of ɹ*-sandhi in RP*

Giegerich (1999) provides an account of *r*-sandhi in RP that is predicated on his base-driven stratification model of Lexical Phonology. Within this model, phonological processes may apply on either of two lexical strata or postlexically: the different behaviour of different phonological processes determines where they can apply in the phonology. This analysis allows for convincing

modelling of some of the variation observed in *r*-sandhi in different varieties, and is able to explain why some speakers avoid word-internal intrusive-*r* in **draw [ɹ]*ing but have intrusive-*r* between words: *saw [ɹ]* it. Giegerich's use of orthographic information in some of his proposed rules allows an explanation of some (literate) speakers' ability to avoid intrusive-*r*.

2.3.3.1 Contexts for ɹ*-sandhi in RP revisited*

One problem for phonological modelling of *r*-sandhi is the range of vowels that may trigger the process, and specifically that they do not seem to form a natural class. (Giegerich 1999: 168) gives a list of linking and intrusive contexts, presented here in (2:5).

(2:5)

Citation form		**Linking-*r* contexts**	**Intrusive-*r* contexts**
bar	ɑː	barring, bar is	baaing, Shah is
store	ɔː	storing, store is	drawing, draw it
cure	ʊə	curing, cure is	skua is
hear	ɪə	hearing, hear it	idea is
hair	ɛə	hairy, hair is	Eritrea is
fur	ɜː	furry, fur is	(*unattested*)
feather	ə	feathery, feather is	vanilla-y, vanilla is

This is clearly similar to the standard descriptive accounts of RP *r*-sandhi, as discussed in Section 2.1, but Giegerich's table includes some additional contexts which are the logical extension of assuming that *r*-sandhi occurs after syllable-final non-high vowels. As Giegerich points out, some of these contexts are open to question: the final vowels in *skua* and *Eritrea* may normally be realised heterosyllabically as [uˑ.ə] and [eˑ.ə] respectively (Giegerich 1999: 168), and, as shown in (2:5), no examples of intrusive-*r* after [ɜː] exist given that [ɜː] has arisen only where there was historically /ɹ/ (*colonel* is the only word where [ɜː] has arisen where there was not historical /ɹ/). So, *r*-sandhi clearly occurs after schwa, and after centring diphthongs, the second element of which is schwa, but *r*-sandhi also occurs after [ɑː] and [ɔː]. Low vowels and central vowels do not make up a natural class on Giegerich's assumptions: central vowels could just as logically pattern with high vowels, or front vowels, or back vowels, and so the contexts for *r*-sandhi seem to form a somewhat arbitrary group. Giegerich's approach to dealing with this issue involves a consideration of how schwa should be underlyingly represented, an analysis of

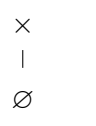
phonetic transcriptions of early RP from the nineteenth and early twentieth century, and also a comparison with the SQUARE vowel.

2.3.3.2 The underlying representation of schwa

Adopting approaches taken in Autosegmental Phonology, Giegerich (1999) represents phonological segments on a 'melody tier' and a 'skeleton tier'. The melody tier contains feature specifications other than length information, while the skeleton tier contains information about length in terms of timing slots, or 'x' slots (as discussed in Giegerich 1992: 174–178). Schwa, then, may be represented as a melodically empty nucleus, or [∅], which may be filled, postlexically, with 'the default melody [ə]' (Giegerich 1999: 139). This approach is used in some models of autosegmental phonology to explain the surfacing of [ɹ] in non-rhotic accents: given a melodically underspecified [∅], [ə] is the default for rhyme positions and [ɹ] is the default in onset position. In this respect, [ə]/[ɹ] share an underlier, in the same way that [ɪ]/[j] and [ʊ]/[w] do (Giegerich 1999: 189).

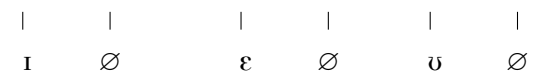
Having proposed /∅ / as the underlier of schwa (and [ɹ]), schwa and the centring diphthongs may be represented as below (Giegerich 1999: 196):

(2:6)



schwa

(2:7)



centring diphthongs

However, Giegerich uses the idea of [∅] not only to link the centring diphthongs, schwa and 'stressed schwa' [ɜː], but also to explain why the low vowels [ɑː] and [ɔː] pattern with them. He suggests that [ɑː] and [ɔː] are surface reflexes of underlying centring diphthongs /ɑ∅/ and /ɔ∅/. Given that in modern RP /ɛə/ is often monophthongised to [ɛː], yet *r*-sandhi is still synchronically a productive process after this vowel, the idea that surface monophthongs may be underlyingly centring diphthongs is not unreasonable.

Similarly to Broadbent's particle phonology account (Broadbent 1991, 1999, see Section 2.4.1), *r*-sandhi is treated not as an insertion rule, but as a parallel to the glide formation that causes [j] and [w] sandhi. This process of liaison, where the onset is associated with the preceding melody, causes [j] or [w] to be the hiatus fillers after high vowels. Giegerich argues that /∅/ is not completely empty, but has an underlying specification of [+sonorant] (1999:

191). Given this assumption, he argues that [ɹ] is the default sonorant consonant, and this is therefore the consonant that is selected when the preceding melody is /∅/. This argument is clearly similar to Broadbent's below. The question of what it is that links the preceding rhyme segment and the onset in sandhi position is answered in different ways depending on the model of phonology being adopted, but the overall mechanisms of these two accounts have a lot in common. Heselwood (2006: 91) questions the status of [ɹ] as the default sonorant: he cites evidence from studies of language acquisition that suggests that [j] is the default sonorant (see also Uffmann (2007) discussed in Section 2.4.3 below for an account of the selection of [ɹ] that does not rely on it being specified as the default sonorant). Heselwood's solution, as discussed above, is to argue that /r/ 'is lexically specified as part of the phonological form of the stem' (2006: 91). Given that Heselwood's model requires that an underlying /r/ can be realised as a surface [ɹ] or [ə] (or indeed [əɹ]), and Giegerich's model suggests that an underlying /∅/ can surface as [ə] or [ɹ] depending on its position in an onset or rhyme, they are perhaps not wholly at odds with each other. Although there are different descriptive terms used in different phonological models, there are only so many logical possibilities for mapping underlying representations onto surface forms, and several of the accounts so far discussed overlap to some extent.

Giegerich goes on to argue that some speakers' ability to avoid intrusive-*r* while maintaining linking-*r* is based on non-phonological factors. For illiterate speakers, there must be a set of (arbitrary) exception markers for words which would otherwise take part in the *r*-sandhi process; for literate speakers, though, the spelling is a very accurate predictor of which words 'should' or 'should not' undergo *r*-sandhi. Giegerich therefore claims there is an '⟨r⟩ condition' (1999: 194). Obviously, almost all models of phonology would ban references to external things such as orthography, but this use of the '⟨r⟩ condition' does seem to fit with the objective facts. Furthermore, this hypothesis can be applied to those speakers who avoid word internal intrusive-*r* while having intrusive-*r* between words: they have the '⟨r⟩ condition' in the lexical version of the rule, but not in the postlexical version.

2.3.4 Summary of accounts which claim to rule out r*-sandhi in rhotic accents*

In relation to non-rhotic speech, the two approaches of having an underlying /r/ or of having an *r*-insertion rule, can be argued for and against. In the case of a rhotic accent, *r*-sandhi would refer to non-etymological intrusive sandhi-*r*, given that etymological 'linking *r*' would be realised

both prevocalically and non-prevocalically. The restriction of intrusive-*r* to non-rhotic accents is motivated by the presence of *r* ∼ ∅ alternations after final [ɑ, ə, ɔ, (ɜ, ɛ)]. By reanalysis, final [ɑ, ə, ɔ] in words with no etymological coda-*r* came to trigger the same *r* ∼ ∅ alternation. In rhotic accents where these linking-*r* alternations do not exist, there would be no reason for intrusive-*r* to emerge (Johansson 1973: 65–66). This argument is based on the diachrony of non-rhotic accents, which is that 'linking-*r*' alternations emerged first, and intrusive-*r* was adopted later as a result of reanalysis (either of underlying representations of historically *r*-less words so that they become *r*-ful, or of the derivational system so that *r*-deletion inverts to become *r*-insertion).

The question of whether these accounts entail a synchronic 'ban' on rhotic speakers producing intrusive-*r* is perhaps not as clear as is suggested by Giegerich (1999: 196) when he appeals to the phonemicist notion of complementary versus parallel distribution to explain the lack of *r*-intrusion in rhotic varieties. In principle, it would be possible for a child learning a rhotic variety of English to acquire an underlying /ɹ/ in e.g. *spar* /spɑɹ/ and also to acquire an alternating abstract underlier in e.g. *spa* /spɑ∅/. This result would require exposure to a 'mixed' rhotic and *r*-intruding system during the child's acquisition of English: the child would have to hear that *spar* does not alternate and always has a surface *r* regardless of its context; at the same time the child would have to hear that *spa* does alternate. Furthermore, this would entail a degree of abstractness in forming underlying representations: some surface *r*s correspond to underlying /ɹ/ while other surface *r*s correspond to an abstract /∅/. However, it is possible for identical phonetic segments to be realisations of separate underlying segments (e.g. many assimilation phenomena, such as the Yorkshire Assimilation described by Broadbent (1999: 19) in which, for example, [p] can correspond to either /p/ or /b/). So, although the circumstances in which a child could acquire a rhotic-and-*r*-intruding dialect are somewhat unlikely, the models discussed so far do not completely rule out the possibility of such a mixed system being acquired. Other approaches to modelling *r*-sandhi also allow for the possibility of an individual speaker having both *r*-sandhi and rhoticity.

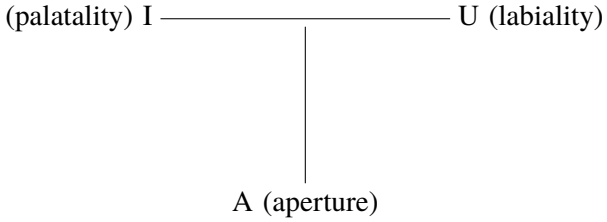
2.4 Models which allow *r*-sandhi and rhoticity to be in parallel distribution

Some phonological models focus on the hiatus-filling property of *r*-sandhi. These do not necessarily limit *r*-sandhi to non-rhotic speakers.

2.4.1 A Particle Phonology account of r*-sandhi*

Broadbent (1991, 1999) discusses *r*-sandhi using a model of phonology that describes vowels and consonants in terms of the same set of place features. This analysis is based on earlier work on Particle Phonology by Schane (1984: 131) that uses three vocalic particles, **I**, **U** and **A**.

(2:8)



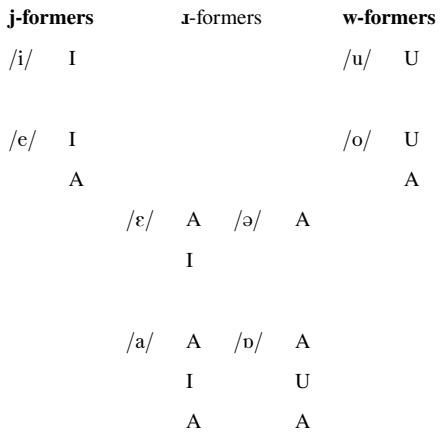
Broadbent assumes *r*-sandhi to be 'the result of a Glide Formation process, whereby some property of the final vowel spreads into a following empty onset position producing a hiatus breaker' (1999: 7). Interestingly, as well as RP data, she uses Leeds data, which include [e] and [o] in the FACE and GOAT sets, to give, for instance, *pay* [peː] and *go* [goː]. Broadbent's Leeds data are set out in (2:9) below (1999: 7).

(2:9)

with him (wi'im)	[wiːjɪm]	*vs.*	with my (wi'my)	[wɪmɪ]
see a	[siːjə]		be on	[biːjɒn]
pay as	[peːjəz]		day off	[deːjɒf]
Sue on	[suːwɒn]		do it	[duːwɪt]
no I'm not	[noːwamnɒt]		go on	[goːwɒn]
piano in	[pɪanowɪn]		piano in	[pianəɹɪn]
yellowing	[jɛlowɪn]		yellowing	[jɛləɹɪn]

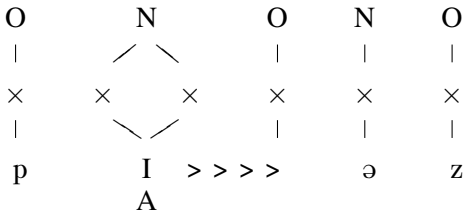
The Leeds data allow Broadbent to claim that 'the appearance of the r-glide after the mid-low and low vowels should be equated with the appearance of [j] and [w] after the high and mid-high vowels. If the appearance of [j], [w] and [ɹ] are all to be explained in terms of glide formation caused by the spreading of a property of the preceding vowel in each case, then it is clearly important to establish what is spreading in each case. Using the particle phonology model with **I**, **U** and **A** as set out in (2:8), the various preceding vowels can be modelled as in the following example (Broadbent 1999: 8).

(2:10)



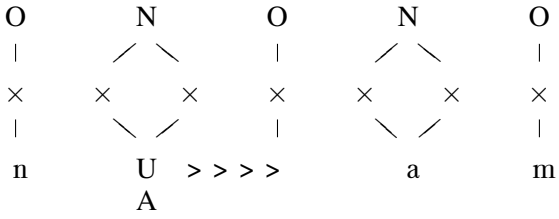
The grouping of vowels in (2:10) suggests that /i/ and /e/ form one group, /u/ and /o/ form a second group and /ə/, /ɛ/, /a/ and /ɒ/ form a third group. The members of each group show the same pattern in terms of glide-formation; they also have the same dominant or head particle. It is therefore logical to suggest that the dominant or head particle is what spreads: /i/ and /e/ have **I** as the dominant particle, the spreading of which leads to formation of [j]; /u/ and /o/ have **U** as the dominant particle, the spreading of which leads to formation of [w], and /ɛ/, /ə/, /a/ and /ɒ/ all have **A** as the head particle, so spreading of **A** leads to formation of [ɹ]. Examples (2:11), (2:12) and (2:13), all taken from Broadbent (1999: 8), show each of these processes.

(2:11)



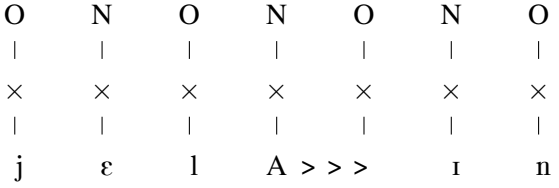
pay as [peːj əz]

(2:12)



no I'm [noːw am]

(2:13)



yellowing [jɛləɹɪn]

Broadbent points out that this model also explains the fact that [e] and [o] do not lead to [ɹ]-formation; despite being non-high vowels, they are headed by **I** and **U** rather than **A**. This

model links the specification of vowels and consonants such that **I** produces [j] in onsets and [i] in nuclei, **U** produces [w] in onsets and [u] in nuclei and **A** produces [ɹ] in onsets and [ə] in nuclei. Many writers make links between schwa and /r/ in terms of the phonetics of [ə] and the approximant [ɹ]. Broadbent goes further to claim that **A** represents place in other types of *r* and in other coronal segments too. Interestingly, part of Broadbent's argument concerns evidence from 'breaking' in English. Traditionally, this diphthongisation process has been described in terms of schwa epenthesis as in (2:14).

(2:14) ∅ → ə / [-low, +long V] __r (Wells 1982: 214)

Particle phonology would argue that the apparent epenthesis of [ə] is not an arbitrary insertion, but rather is caused by an adjacent segment disintegrating and revealing its internal structure. Broadbent argues that it cannot be the preceding vowel that disintegrates, but the following /r/ (Broadbent 1999: 12). Furthermore, she gives data from contemporary Orkney English that show that breaking of /l/ also causes the appearance of [ə]. This specification of both /r/ and /l/ with **A** may be useful in explaining the *l*-sandhi that has been observed in some areas of the United States (see Gick 1999, Gick 2002).

This model, which attributes *r*-sandhi to a glide-formation process caused by spreading of the place feature **A** from the vowel to the following onset, does not link *r*-sandhi to rhoticity. Rather, it is the need to avoid hiatus that leads to the sandhi, and the resulting sandhi hiatus-breaking segment is not arbitrary, but is the direct result of the place specification of the preceding vowel. However, as McMahon (2009: 104) notes, given spreading of **A**, it is not clear why [ɹ] should occur rather than other possibilities such as [l]. Although it may be the case that [ɹ] is just **A** while [l] contains other particles, Broadbent does not discuss this distinction, and Schane notes that 'particle phonology is a theory about segmental entities and, in particular, vowels' (1984: 152n), so he does not give particle specifications for consonants. In particular, Broadbent notes that the parallel between glide-formation after /i/ and /u/ and *r*-sandhi after non-high lax vowels is perhaps problematic. Catford (1988) argues that there are three stages in the production of a vowel: the on-glide phase, the hold phase and the off-glide phase. Prolonging the articulation of /j/ or /w/ results in the articulation of a vowel /i/ or /u/. However, as Broadbent points out, prolonging the articulation of [ɹ] produces an *r*-coloured schwa, rather than [ə]. So, if glides and their cognate vowels are identical apart from the length of the hold-phase resulting from their occurrence in different syllabic positions, then schwa and *r* do not fit this pattern (this argument

is used by Uffmann (2007) where he argues that glide-formation after schwa would produce not [ɪ] but [ɤ]: see example (2:34) in Section 2.4.3). However, Maddieson & Emmorey (1985) argue that glides have a greater constriction than vowels, and are not merely vowels in a different syllabic position. Broadbent argues that, under this analysis of the relationship between vowels and glides, [ɹ] is the cognate glide for [ə] as it is the result once 'constriction has been added' (1999: 17). However, Broadbent does say that '**A** in an onset is a very imprecise structure' (1999: 17), so the 'why *r*?' question is still open to debate.

Notwithstanding the potential problem with the spread of **A** leading necessarily to production of [ɹ], this account does seem to raise questions about the situation in rhotic varieties. If *r*-sandhi is glide formation, in parallel to the formation of [j] and [w], then in varieties that do not exhibit *r*-sandhi are other forms of glide formation similarly absent? In the course of his Lexical Phonology account of *r*-sandhi in RP (discussed in Section 2.3.3), Giegerich notes that ' [r]-sandhi in RP is a phenomenon that is exactly paralleled by the [j]-sandhi found in *say it* and the [w]-sandhi found in *show it*' (1999: 195). He notes that these two sandhi phenomena do not result from a re-syllabification rule which would take the final vowel in a rhyme and link it to the following onset: 'if that were the case then the surface form *[sejɪn], rather than [seɪʲɪŋ] would be predicted' (Giegerich 1999: 189). Clearly, forms such as *saying* [sejɪn] are part of Broadbent's Leeds data, and her account too does not attribute these to re-syllabification: spreading of features to an empty following onset position (only the dominant place feature spreads in Broadbent's account) is not the same as resyllabification, where a segment is moved wholesale to a following onset. Giegerich notes a personal communication from Claire Sigsworth, who points out that ' [ʲ ʷ] sandhi appears to occur in Scottish Standard English although this variety does not diphthongise /e o/' (Giegerich 1999: 287). Now, if Broadbent's model were to be applied to a rhotic variety such as Scottish Standard English, there would need to be an explanation for why *r*-sandhi does not occur given that [ʲ ʷ] sandhi do. Giegerich's explanation for the absence of *r*-sandhi in rhotic varieties, even if they do have [ʲ ʷ] sandhi, is that '[r] and schwa (however phonetically similar they may or may not be) are not in complementary distribution (*Leda* vs. *leader*, *piston* vs. *cistern* etc.) and, hence cannot have a common underlier' (1999: 196). If there should turn out to be any possibility of *r*-sandhi in a rhotic variety, as Hay & Sudbury (2005) suggest there could be, then this problem of the impossibility of a common underlier would need to be solved. Heselwood's argument that different forms may be stored

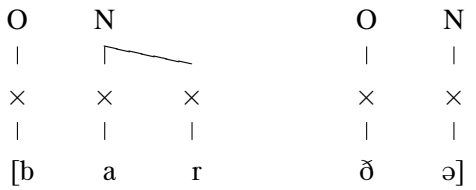
seems a possibility (so that different underlying forms of *Leda* would be used in *Leda goes* and *Leda is*), although clearly it is at odds with the phonological assumptions made by most phonologists, including Giegerich above. Incidentally, I notice that Scots/SSE speakers seem to be able to have hiatus more consistently in places where speakers of other British varieties of English would avoid it: *the other*, for instance, which would consistently be [ðiʲʌðə] in RP, is frequently [ðəʌðər] in SSE. If this observation is right, then perhaps the lack of *r*-sandhi reflects a greater permissibility of hiatus than in, for instance, RP, and the link with rhoticity does not even arise as a problematic issue.

2.4.2 A 'floating sound' account of r*-sandhi*

Harris describes a model of non-linear phonology that contains a skeletal tier of timing slots and a melodic tier (1994: 35). This approach is also taken in Gussmann (2002). Because the skeletal and melodic tiers are independent, there does not have to be a one-to-one association of melodic units with skeletal points: one melodic unit can be associated with two skeletal points, as in long vowels; two melodic units can be associated with one timing slot, as with affricates. These lines of association between the skeletal and melodic tiers can be broken, or new ones formed: these processes are respectively known as 'delinking' and 'spreading' (Harris 1994: 35). A key point is that if a melodic unit is not associated with a skeletal point at the end of a phonological derivation it cannot be realised: a non-associated melodic unit would be present in the phonological derivation, but will not be pronounced. This idea of 'floating sounds' provides another way of thinking about processes involved in loss of rhoticity and in *r*-sandhi: rather than whether or not there is an underlying /r/ and the nature of insertion or deletion rules, this approach considers whether a melodic 'r' is licensed to a skeletal point, and thus whether or not it is pronounced.

In the following discussion, examples (2:17), (2:18) and (2:19) are taken from Harris (1994: 249).

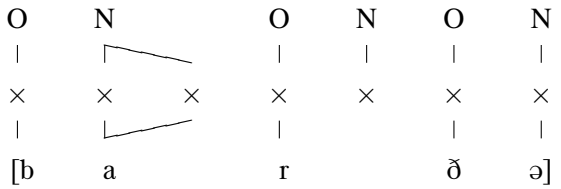
(2:15)



Example (2:15) shows how, for a rhotic speaker pronouncing the sequence *bar the*, the etymological *r* can be licensed in the rhyme of a syllable; as Harris explains, in rhotic dialects 'the

retained *r* in this context can be shown to occupy the second position of the branching nucleus' (1994: 68). Alternatively, the *r* could be licensed in the onset of a syllable with an empty nucleus, as in example (2:16).

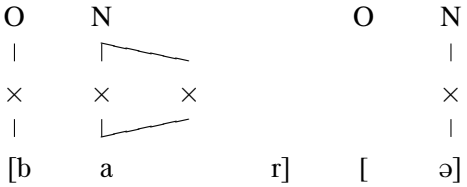
(2:16)



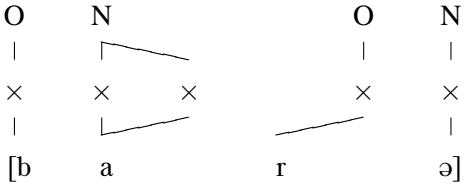
Rhotic speakers are able to realise *r* in the onset of such an empty syllable, whereas non-rhotic speakers cannot, because non-rhoticity can be 'understood as reflecting the weak licensing capacity of the final empty nucleus' (Harris 1994: 248).

For a non-rhotic speaker, the etymological *r* is still there in the underlying representation, but it is 'floating'. If the two words *bar a* are said in citation form, the *r* cannot be licensed to an onset position, and thus remains unrealised, as in example (2:17a). However, in connected speech, the *r* can be licensed to an onset, as shown in example (2:17b), and thus it is realised.

(2:17) a.

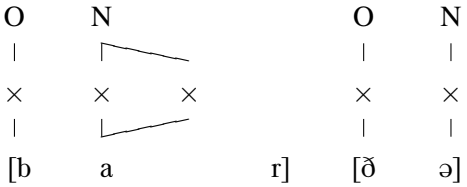


b.

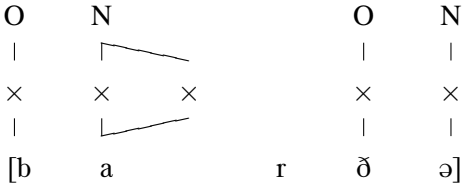


If the same non-rhotic speaker realises *bar the*, even in connected speech there is no available onset position to license the floating *r*, as is shown in example (2:18b).

(2:18) a.



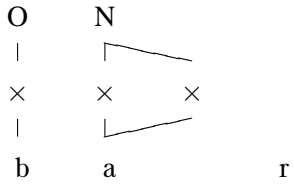
b.



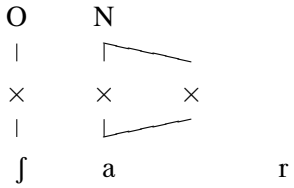
According to this model, speakers who have intrusive-*r* must have a floating *r* in the underlying representation of historically *r*-less words, such as *Shah*. So *bar* in example (2:19a) and *Shah*

in example (2:19b) have the same structure with an underlying floating *r*, and this correlation explains the production of surface intrusive-*r*.

(2:19) a.



b.



Harris discusses four phonological systems with differing distributions of *r*: as well as detailing their properties, he comments on the real-world nature of these systems. Harris explains that although the distributions of *r* are categorical for many speakers, there are geographical areas in which 'the realization of historical *r* is subject to different degrees of variability, typically involving competition between rhotic and non-rhotic norms of pronunciation' (Harris 1994: 232). One of the places specified by Harris is Lancashire. Harris' proposed 'System A' is a rhotic dialect with no *r*-sandhi and his 'System C' is a non-rhotic dialect where *r*-sandhi leads to the realisation of linking and intrusive-*r*. If some Lancashire speakers were found to be rhotic and to produce intrusive-*r*, then one explanation would be that they were switching between two systems which were in competition with each other. This suggested switching is not unique to the 'floating *r*' account, of course: such grammar competition could apply to any of the models of phonology discussed above.

However, grammar competition is not the only possibility here. The 'floating *r*' account given by Harris does not predict that rhoticity and *r*-sandhi are necessarily in complementary distribution. He writes that it 'would be entirely consistent with [the floating *r* account] if intrusive-*r* arose independently of linking-*r*' (Harris 1994: 252–3). Given that rhotic dialects do not have linking-*r* as such, this questions the standard assumption that intrusive-*r* developed only where linking-*r* was already established. Linear accounts of loss of rhoticity involve the addition of new rules to the phonological system, such as a rule of R-Dropping, and in some accounts a process of rule-inversion so that the $r \sim \varnothing$ alternation is reanalysed as a process of R-insertion. This rule-inversion 'firmly implies that the intrusive . . . pattern is an off-shoot of an older non-intrusive [pattern]' (Harris 1994: 252). However, Harris claims that a floating-*r*

account is 'entirely neutral' (1994: 252) on the chronological development of intrusive-*r*. He goes on to write: 'it would be entirely consistent with the ... [floating *r*] analysis if intrusive *r* arose independently of etymological linking *r*. In fact, given that domain-final *r* is potentially present in any system, it would not be surprising to discover cases of intrusive *r* in **rhotic** dialects' (1994: 253). The floating-*r* model explains the development of intrusive-*r* as a lexical change: 'it is an extension of the lexical incidence of domain-final *r* to morphemes which were etymologically *r*-less' (Harris 1994: 252). According to Harris, the location of this change in the lexicon means that typical non-rhotic and *r*-intruding dialects are similar to dialects which have hyperrhoticity (see Wells 1982: 522). In a hyperrhotic dialect, such as some West Country varieties, forms such as *comma*[ɪ] are found even in non-sandhi contexts. This means that the *r* here is somehow present in the lexical entry for the word *comma* rather than being the result of a sandhi process. As the floating *r* model gives a lexical source to sandhi-conditioned intrusive-*r* too, this allows Harris to argue that 'hyper-rhotic dialects are similar to non-rhotic intrusive-*r* dialects' (1994: 296). This argument is the basis for Harris' claim that there is 'plenty of evidence of intrusive *r* in rhotic dialects, past and present' (1994: 253). Harris' use of hyper-rhotic examples though, causes other phonologists to question this claim; for example, McMahon (2000: 263) argues that 'neither Harris' historical evidence nor his dialectal data support his contention that linking and intrusive [r] in varieties with both, are independent'.

Harris' explanation of the difference between his 'type B' accents (non-rhotic, with linking-*r* but not intrusive-*r*) and 'type C' accents (non-rhotic, linking and intrusive-*r*) is 'purely one of lexical incidence; floating *r* is present in the lexical representation of a greater number of forms in C than in B (and than in A, for that matter)' (1994: 250). While this is one way of accounting for the difference between type B and C accents, it makes an interesting implication when it comes to rhotic (type A) accents. If they really can be *r*-intruding as well as being rhotic, then some *r*s must be linked to a syllable rhyme position (in etymologically *r*-ful words such as *star*), while non-etymological *r*-ful words must have gained a floating *r* (for example *Shah*). Effectively, for such a rhotic-and-*r*-intruding speaker, some *r*s are floating while others are not. This discrepancy is not necessarily a problem for Harris: when describing the difficulty of accounting for pre-(historical)-*r* vowel neutralisation (the *bird, heard, word* merger) in terms of matching a restricted set of vowels to 'phonemic categories based on the maximal inventory found in other contexts' (1994: 256–7) he writes that the problem 'simply does not come up for

discussion within a non-phonemic phonology, particularly if we are not wedded to the assumption that the same system of phonological distinctions necessarily holds in all contexts' (1994: 257). Harris' own dialectal and historical examples to show that *r*-intrusion is not neccessarily linked to linking-*r* have been dismissed by other writers. However, the fact is that the floating *r* account does not systemically rule out a rhotic speaker having no $r \sim \varnothing$ alternation in linking words but having such an alternation (explained by the presence of a floating *r*) in etymologically *r*-less intrusion words. The question of why such a speaker should add a floating *r* to words like *Shah* remains, but the account does not ban the speaker from doing so.

2.4.3 Optimality Theory accounts of r*-sandhi*

OT has a function that generates an infinite number of potential output forms, or candidates, from the underlying lexical representation, and a ranked set of constraints. The candidate that violates the set of constraints in the least serious manner is selected as the optimal output form. The ranking of constraints is important here: a candidate can violate many constraints that are satisfied by other candidates, but still be the optimal form so long as there is a higher ranking constraint for which it does better than any other candidate.

There have been several discussions of modelling *r*-sandhi in OT (for a summary of these see Uffmann 2007: 453–4). The problem that several of these have had to deal with is to explain why *r* is chosen as the optimal consonant for hiatus filling after non-high vowels in non-rhotic accents. The first OT example I discuss, McCarthy (1993), does seem to restrict intrusive-*r* to non-rhotic dialects, but the second account, Uffmann (2007), does not.

McCarthy (1993) uses a set of data from Massachusetts English, a non-rhotic variety that has active *r*-sandhi processes. Assuming that this dialect has the standard patterns of $r \sim \varnothing$ alternations that have already been discussed in regard to RP, McCarthy shows that two constraints can explain the non-rhoticity of the dialect and the presence of *r*-sandhi. These constraints are given in (2:20) taken from McCarthy (1993: 172).

(2:20) a. Coda-Cond *V*r*X]$_\sigma$

b. No-Hiatus *V]$_\sigma$[$_\sigma$V

The first constraint, Coda-Cond (2:20a), rules out *r* in the rhyme of a syllable. This can explain the non-rhoticity in Massachusetts English. The second constraint, No-Hiatus (2:20b), bans a vowel-vowel sequence across a syllable boundary, which, when the first vowel is [ɑ, ɔ, ə], is the environment in which *r*-sandhi occurs. McCarthy argues that these three vowels are

'not an arbitrary set: they are precisely the non-diphthongal nuclei that can occur word-finally in this dialect of English' (1993: 171). He argues that other permissible word-final vowels are diphthongal, so while some of the accounts discussed above have referred to high vowel phonemes such as /iː/ and /uː/, McCarthy lists the relevant vowels as phonetic diphthongs: '[ij] *busy*, [ej] *delay*, [ɑj] *deny*, [uw] *Peru*, [ow] *veto*, [ɑw] *allow*, [ɔj] *alloy*' (1993: 171). In these diphthongal examples, hiatus does not arise because the second element of the diphthong can fill the onset position. However, the question of 'why *r*?' remains; eventually McCarthy has to add a rule to his constraint-based OT account that inserts *r* in the relevant contexts.

Interestingly, McCarthy notes that in one specific detail Massachusetts speech does not have the standard $r \sim \varnothing$ alternations: after reduced function words, hiatus does occur. A set of examples is given, and McCarthy notes two examples as 'particularly eye-catching' (1993: 174). These are given in example (2:21).

(2:21) a. *I wanna eat* versus *Wandar eats*

b. *gonna invoke the lawr of*

This free violation of the No-Hiatus constraint is not universal: Wells (1982: 227) gives several intrusive-*r* examples with the class of reduced function words, such as *wanna*, *gotta*, *hafta*. These are words after which intrusive-*r* does not occur in Massachusetts English. So, McCarthy's use of the two constraints in (2:20) would be enough to account for *r*-sandhi in many non-rhotic varieties, but in the case of Massachusetts English he has to adopt a different strategy, and proposes a constraint on prosodic words ending with a vowel. This constraint is given in (2:22).

(2:22) Final-C *V)$_{\text{PrWd}}$

As McCarthy views [ɑ, ɔ, ə] as the only true vowels that can occur on word-final position in English, this constraint can account for *r*-intrusion in examples such as *saw it*. McCarthy explains that lexical words correspond to prosodic words in an example such as (*John*)$_{\text{PrWd}}$ (*saw*)$_{\text{PrWd}}$ (*Ed*)$_{\text{PrWd}}$ (McCarthy 1993: 177), and in such cases intrusive-*r* is obligatory. However, reduced function words are not in Prosodic-Word-final position, so the reduced function words in examples such as *to eat* or *shoulda eaten* are bracketed onto the preceding lexical word: (*to eat*)$_{\text{PrWd}}$, (*shoulda eaten*)$_{\text{PrWd}}$. This account explains the pattern of intrusive-*r* in Massachusetts English. Because speakers of this variety do produce forms such as *Wanda left* and *Homer left* (they are non-rhotic speakers), this analysis allows McCarthy to demonstrate 'a fundamental tenet of OT, surface violability of constraints as required by other, dominant constraints' (1993: 187).

Specifically, the CODA-COND constraint outranks the FINAL-C constraint, so while intrusive-*r* is produced because prosodic words cannot end with a vowel, the ban on *r* in the rhyme of a syllable takes priority in cases where satisfying FINAL-C would lead to such a rhyme *r*.

However, the actual justification for the insertion of *r* has to be stated as a rule. Uffmann describes this as 'an additional, phonologically arbitrary, postlexical rule' (Uffmann 2007: 454) to account for the selection of *r*. This need for a rule, in addition to constraints, has been argued to be a challenge to OT as a theory: 'if OT still needs rules to account for unnatural phonological processes, why do we need it in the first place?' (Uffmann 2007: 454). Uffmann's argument is that OT can account for the selection of *r* in the r-sandhi contexts set out in (2:1) as part of a wider model of consonant epenthesis, which takes into account the prosodic context for the epenthesis.

In terms of syllable structure, Prince and Smolensky suggest that nuclei are more prominent than onsets or codas. They also suggest a scale for the prominence of individual segments, and this turns out to be the same as the sonority scale widely mentioned in phonological theories. These two scales are given by Uffmann (2007: 459) as (2:23) and (2:24) below, where '*x* > *y*' means '*x* is more prominent than *y*'.

(2:23) Syllabic prominence: Peak > Margin

(2:24) Segmental prominence: Vowels > r > l > nasals > obstruents > laryngeals

By combining the two scales, two sets of ranked constraints are created, given in (2:25) and (2:26).

(2:25) *Margin/V » *Margin/r » *Margin/l » *Margin/nas » *Margin/obs » *Margin/lar

(2:26) *Peak/lar » *Peak/obs » *Peak/nas » *Peak/l » *Peak/r » *Peak/V

These two scales show that margin positions are most preferably filled with laryngeal consonants, and that peak positions are most preferably filled with vowels. As a result, a vowel in margin position is very marked, as is a laryngeal consonant in peak position. Uffmann uses these markedness scales to explain why glottal stop epenthesis is preferred in margin positions: [ʔ] is the least marked segment in these positions.

Two basic constraints in OT are given in (2:27) and (2:28) below (again as cited by Uffmann 2007: 460).

(2:27) ONSET Syllables have onsets

(2:28) DEP-IO Output segments have a correspondent in the input.

The ranking of these two constraints will determine whether or not epenthesis will take place: if ONSET is the higher ranked then a segment will be inserted because the need to have an onset is more important than the need not to add material. However, these two constraints on their own do not indicate which segment should be inserted: for this, the markedness scale for syllable margins in (2:25) is also needed (onsets are, of course, syllable margins). By adding this scale of constraints, the following tableau can be produced:

(2:29) Example tableau for German *Elch* ('moose') (Uffmann 2007: 460)

/ ɛlç/	ONSET	DEP	*Margin/V	*Margin/nas	*Margin/obs	*Margin/lar
a. [ɛlç]	*!					
b. ☞ [ʔɛlç]		*				*
c. [tɛlç]		*			*!	
d. [nɛlç]		*		*!		
e. [jɛlç]		*	*!			

Here, the optimal candidate, [ʔɛlç] adds an onset, and, crucially, this onset is a laryngeal segment, which is least marked in syllable margins.

When it comes to explaining *r*-sandhi, there is a problem with the markedness scale of constraints given in (2:25). The above account of glottal stop epenthesis treats syllable onsets as margins, yet glide insertion (and *r*-insertion) involves filling an empty onset in order to avoid hiatus between two vowels. According to the scale in (2:25), the preferred segment in these cases should be [ʔ]. Uffmann's solution is to claim that 'intervocalic onsets are not treated as margins in many phonological systems but rather as peaks' (Uffmann 2007: 461), and that, therefore, the markedness scale in (2:26) should be applied instead to the intervocalic context to give (2:30).

(2:30) *V_V/lar » *V_V/obs » *V_V/nas » *V_V/l » *V_V/r » *V_V/V

Uffmann adds two further constraints (the importance of which will be clarified when the case of *r*-insertion is discussed below: they do not play a role in glide formation after high vowels).

(2:31) $*G_{[-hi]}$ glides are [+high]

(2:32) DEP(hi) no insertion of the feature [high]

This addition allows for the following tableau to be constructed to explain the consonant epenthesis after [+high] vowels (2:33) and [-high] vowels (2:34).

(2:33) Glide insertion after [+high] vowels (Uffmann 2007: 466)

/kiː ɪz/		Onset	*G[-hi]	Dep(hi)	Dep	*V_V/lar	*V_V/r	*V_V/V
a.	[kiːɪz]	*!						
b. ☞	[kiːjɪz]				*			*
c.	[kiːrɪz]				*		*!	
d.	[kiːʔɪz]				*	*!		

Three of the candidates in the tableau in (2:33) have hiatus breakers and, therefore, do not violate Onset. Of these three, the glide [j] is selected over [ɹ] or [ʔ] as the optimal epenthetic segment because of the markedness scale in (2:30). Now, were the sort of particle phonology representations used by Broadbent (1999) to be used here, this ranking of constraints would have already accounted for *r*-sandhi: we could simply claim that after non-high vowels [ɪ] is the 'glide' that is inserted, due to a sharing of a place specification with preceding non-high vowels. However, Uffmann does not model *r* in this way (indeed, he outlines a series of differences between [ɪ] and the glides [j w] (2007: 469–70)). He writes that in *r*-sandhi contexts 'glide formation is apparently blocked because a different consonant is used' (Uffmann 2007: 463). Kraemer (2005: 8), on the other hand, argues against Uffmann's views, claiming that the fact that *r* alternates with schwa suggests it is parallel to the high vowel∼glide alternations, and also that the phonetics of sandhi-*r* suggest it is a glide. Clearly, one issue is how the segments that are included in OT tableaux are modelled in terms of their features. However, accepting Uffmann's description of [ɪ], the constraints introduced above are enough to account for *r*-insertion. The constraint in (2:31) bans non-high glides in English; the constraint in (2:32) prevents insertion of [+high], so glides cannot be inserted context-free (in glide-insertion such as in *key is* [kiːjɪz] above, the [+high] feature in the glide is not inserted but spreads from the preceding vowel). The following tableau shows *r*-insertion.

(2:34) Intrusive [ɹ] after [-high] vowels (Uffmann 2007: 466)

/lɔː ɪz/		Onset	*G[-hi]	Dep(hi)	Dep	*V_V/lar	*V_V/r	*V_V/V
a.	[lɔːɪz]	*!						
b.	[lɔwɪz]			*!	*			*
c.	[lɔʏɪz]		*!		*			*
d. ☞	[lɔɹɪz]				*		*	
e.	[lɔːʔɪz]				*	*!		

Here, again, some segment has to be inserted to satisfy Onset. Glide formation could result in [lɔʏɪz], which does not violate Dep(hi). However, [ʏ] is 'not a possible segment of English'

(Uffmann 2007: 466): Uffmann presumably means by this that [ɤ] violates the constraint against non-high glides, *$G_{[-hi]}$. Glide formation could result in [lɔwɪz], yet this violates Dep(hi), as the [+high] specification of [w] has to be inserted: it cannot spread from a preceding [ɔ]. This leaves [ʔ], obstruents, nasals, [l] and [ɹ] as potential segments, and the markedness scale in (2:30) means that inserting [ɹ] is the least marked available option in an intervocalic context.

This explanation rests on the assumption that intervocalic onsets should be treated as peaks, which does seem counter-intuitive: they represent a boundary between two syllable rhymes. Uffmann's argument is that glides are inserted in intervocalic contexts 'to make the inserted element as similar to a vowel as possible' (2007: 461), which seems logical, and yet the position that the segment is inserted is at the boundary between two syllables, so treating it as a margin also seems logical.

Uffmann's account is interesting with respect to links between *r*-sandhi and non-rhoticity. He writes that his analysis 'does not seem to preclude the possibility of rhotic accents having intrusive [ɹ]' (2007: 468), and goes on to argue that this is not necessarily an argument against the model he has proposed. He argues that, while synchronically there is nothing to stop rhotic speakers from using [ɪ] as an epenthetic segment, without the diachronic process of loss of rhoticity there would be no reason for them to start doing so. The question I would ask arising from this conclusion is whether rhotic speakers would use any of the epenthetic segments in, for example, (2:34) above, or whether they would be happy to have a hiatus between vowels. The controlled reading and elicitation tasks I carried out in East Lancashire address this question, and are discussed in Chapter 4.

2.5 Usage-based models of the development of *r*-sandhi

2.5.1 Evidence from New Zealand English in the late 19th and early 20th centuries

Hay & Sudbury (2005) use archive recordings of New Zealand speech to investigate links between rhoticity and *r*-sandhi. Contemporary General New Zealand English is non-rhotic (although there is a variety spoken in the Southland area of the South Island that retains some rhoticity (Hay & Sudbury 2005: 803)). There was, however, a degree of rhoticity in early New Zealand English speakers, as the Origins of New Zealand English (ONZE) project has found. Hay & Warren (2002) find that intrusive-*r* is present in current New Zealand English, although 'the phenomenon is far from categorical in modern New Zealand English' (Hay & Sudbury 2005:

803). By using archive sound recordings, Hay and Sudbury trace the decline in rhoticity and the emergence of r-sandhi.

Their data are taken from two corpora: the Mobile Unit Corpus (MU) and the Goodyear Corpus (GC), held by the ONZE project at the University of Canterbury, New Zealand. The MU recordings were made in the late 1940s of speakers born between 1850 and 1900. The GC recordings were made between 1989 and 1995 of speakers born between 1890 and 1930. Hay and Sudbury used fifty-seven speakers from the MU corpus, together with 8 GC speakers, in order to extend their data well into the twentieth century when New Zealand English 'was characterised by relatively stable nonrhoticity' (Hay & Sudbury 2005: 805). There are certain limitations on the data available: more men than women were interviewed; there is a bias towards certain areas of New Zealand 'particularly Otago on the South Island' (Hay & Sudbury 2005: 805); the South Island speakers are often grouped such that four or more are from a single town, whereas the North Island speakers are more spread out.

The data were analysed auditorily, and two variants were encoded: [r] (which included any rhotic, even though most tokens were approximants) and ∅. It was found that rhoticity declines in more recently born speakers. Hay and Sudbury go on to consider a wide range of factors that may effect linking /r/ across word boundaries (2005: 807), that is, tokens which historically contained /r/. Of these, a VARBRUL analysis retains the following factors as significant predictors of linking /r/:

- The backness of the following vowel (back vowels favour)
- The backness of the preceding vowel (back vowels favour)
- The lexical frequency of the following word, and the frequency of collocation of the word pair (common word pairs favour, high lexical frequency of the following word disfavours)
- The level of rhoticity of the speaker (lower rhoticity disfavours)
- The sex of the speaker (female speaker disfavours)

(Hay & Sudbury 2005: 807)

Following further statistical tests, speaker sex and level of rhoticity emerge as the most significant predictors of linking /r/ in the data. As the level of rhoticity declines, so does the likelihood of speakers using /r/ in linking contexts. However, although the level of linking /r/ declined as rhoticity declined, the absolute level of linking /r/ remained high, at levels consistently greater than 50%, even when rhoticity had been lost from other positions. The fact

that speaker sex was also significant allows Hay and Sudbury to suggest that women may have been leading the change away from rhoticity, as well as the parallel reduction in use of /r/ in linking contexts.

The data for intrusive-*r* are more limited: Hay and Sudbury mention that 'for nineteen of our speakers, no potential intrusive /r/ word-boundary environments occurred within the stretch of analysed speech' (2005: 812). This illustrates potential problems with corpus-based approaches, where the corpus is based on conversational speech and the phenomenon to be investigated is low frequency. However, despite the relatively small number of tokens in the data, some patterns are evident. It is to be expected that 'intrusive /r/ is most likely to be produced by speakers with no rhoticity' (Hay & Sudbury 2005: 813). However, Hay and Sudbury also mention that 'a nontrivial percentage of speakers both are partially rhotic and display some intrusive /r/ ' (2005: 813). Their data also show that intrusive /r/ 'appeared well before rhoticity completely disappeared' (2005: 816). Clearly, this matches some claims made by Harris about the development of intrusive-*r* in England (see Harris 1994: 252–254), and has implications for the diachrony of *r*-sandhi. Hay and Sudbury argue that their data is evidence 'against the existence of a simple reanalysis, in favour of a process that was much more gradual and complex' (2005: 817). Their data, therefore, seem to be evidence against the rule-inversion, *r*-insertion accounts of the rise of r-sandhi. (It's worth noting though that their data may not be quite so clear as is I have suggested here: the issue of whether someone with 8% realised coda-/r/ merits the label 'rhotic' is open to question). However, interestingly, they still argue that both linking and intrusive-*r* 'were causally tied to the loss of rhoticity' (2005: 813). So although the potential for speakers to be both partially rhotic and have intrusive-*r* calls into question phonological models which are based on a binary distinction between rhotic and non-rhotic speakers (accounts based on rule-inversion or on changing the underlying representations of historically *r*-less words), Hay and Sudbury's data do still suggest a causal link between loss of rhoticity and the development of *r*-sandhi. This possibility is interesting given the discussion in Uffmann (2007: 468), which suggests that it is possible for speakers synchronically to be able to cope with both being rhotic and having intrusive-*r*, but that there would be no reason for them to have developed this state of affairs without a loss of rhoticity.

2.6 Summary

A survey of the existing literature on *r*-sandhi shows that there is still a debate regarding the following questions. Is there a link between the ability of *r* to occur in rhymes and the permissibility of empty onsets? If so, is it a *phonological* link or a *historical* one? Why do (most?) rhotic accents have no need to avoid a hiatus between two syllables, yet most non-rhotic accents (apart from some varieties found in South Africa and the southern United States) need to introduce a hiatus breaker (usually [ɹ]) when a potential hiatus occurs after a non-high vowel? Do the same patterns occur after high vowels, where many accents introduce a linking glide to avoid a hiatus? In other words, do non-linking/intrusive-*r* accents have glides after high vowels, or do these accents have no need to avoid hiatus in these contexts either?

Some phonologists (including Broadbent (1991, 1999) and Gick (1999)) argue that *r*-sandhi is a case of liaison, parallel to other glide-formation processes. However, under this approach, the non-occurrence of *r*-sandhi in rhotic accents remains to be explained. Giegerich (1999) also analyses *r*-sandhi as an example of liaison, and explains the non-occurence of *r*-sandhi in rhotic accents using phonemicist terms (i.e. because schwa and /ɹ/ are not in complementary distribution they cannot have the same underlier). These accounts suggests that [ɹ] is a glide in the same way that [j] and [w] are, yet the distribution of [ɹ] is different: there are no minimal pairs in English where the presence or absence of word final [j] or [w][9] is what makes the distinction, in the way that presence or absence of word final [ɹ] does in *Leda* vs. *leader* for rhotic speakers. Uffmann's OT model rules out a glide formation explanation for *r*-sandhi: he says you would get [ʏ] which 'is not a possible segment of English' (2007: 466). This suggests terms such as 'glide' are used differently by different phonologists: if some models say that [ɹ] is the outcome of glide-formation after non-high vowels (or non-high lax vowels (Broadbent 1991: 296)), and others say that [ʏ] is the outcome of glide-formation in the same context, then there is a difference in what counts as a glide.

Other research has shown that /ɹ/ does not pattern identically with the glides [ʲ] and [ʷ]: Newton & Wells (2002) suggest that child language acquisition data do not support a unified model of glides. They say that, were such an approach to be taken, 'one would expect to observe /ɹ/ appearing at around the same time as the other types of liaison. In fact, it does not; it emerges later' (Newton & Wells 2002: 292). Britain & Fox (2008) examine the use of the glottal

9. Of course, it may be argued that [j] and [w] do not occur word finally, unless the explanation of the diphthongal nature of vowels in McCarthy (1993: 171) is adopted.

stop as a hiatus breaker in London speech, and show that their speakers are 'more resistant to using a glottal stop to replace the glides [ʷ] and [ʲ] than they are to replace [ɹ]' (2008: 33).

So, in terms of beginning to address RQ4, the existing literature presents a mixed picture. Most descriptive accounts do not indicate the rhotic speakers ever have intrusive-*r*, and most phonological models rule out this overlapping distribution.

The long-running debate about whether *r* is underlying and gets deleted, or whether there is no underlying rhyme /ɹ/ and *r* gets inserted does not typically address the possibility of rhotic speakers having intrusive-*r*. According to either hypothesis, non-rhotic speakers have an $r \sim \varnothing$ alternation in linking-*r* words and this is extended to intrusive-*r* words, either by the application of an insertion rule which affects these words, or by a reanalysis of their underlying sructure so that they now include an underlying rhyme /ɹ/ (or some underlier that can be realised as *r*). Rhotic speakers do not have $r \sim \varnothing$ alternations in linking-*r* words, so this provides no motivation for inventing an *r*-insertion rule that applies to intrusive-*r* words. Neither does it give any indication as to why these words would be reanalysed with an underlying *r* if there were no existing pattern of alternations on which to base such a reanalysis. However, in surveying these accounts, I have not found evidence for an outright ban on rhotic speakers producing intrusive-*r*, despite the apparent unlikeliness of such a mixed system being acquired, and despite the claims that rhotic speakers cannot have an intrusive-*r* process because /ɹ/ and schwa are not in complementary distribution.

There are some other models which do not explicitly ban rhotic speakers from having intrusive-*r*, even if such speakers are reported to be unattested. Harris' floating *r* account explicitly states that rhotic speakers could produce intrusive-*r*. The problem of why rhotic speakers would introduce a floating *r* into the lexical representation of *Shah* remains though, given that for the same speakers, words such as *bar* contain an *r* which is *not* floating. OT accounts have also found intrusive-*r* problematic. McCarthy (1993) had to stipulate an arbitrary insertion rule in order to explain why *r* appears in intrusive contexts. However, several accounts do at least allow for rhotic speakers to have intrusive-*r*, because they are not based on the existence of $r \sim \varnothing$ alternations in linking-*r* words. Spreading accounts of intrusive-*r*, such as Broadbent (1991, 1999), do not in principle rule out rhotic speakers from producing intrusive-*r*, although the issue of why *r* in particular results from the spreading process is not answered conclusively. Uffmann's OT account does not rely on alternations or spreading, although it does

entail jumping through some theoretical hoops concerning the peak and margin of a syllable. This account does not rule out the possibility of rhotic speakers having intrusive-*r*. Again though, the question of why rhotic speakers would begin to produce intrusive-*r* remains, and for Uffmann this actuation problem is sufficient to explain why (most varieties of) rhotic speakers do not produce intrusive-*r*.

This socio-historical explanation for the absence of intrusive-*r* in rhotic varieties suggests a need to consider social factors such as dialect contact. The next chapter explores dialectal evidence from East Lancashire and explains why this dialect area is relevant for investigating the relationship between rhoticity and *r*-sandhi.

Chapter 3

Rhoticity and *r*-sandhi in East Lancashire speech

East Lancashire speech has not been widely discussed in the literature on English Dialectology or English Phonology. Shorrocks (1998) provides a detailed grammar of Bolton English, which could be argued to be on the south-western border of East Lancashire; Vivian (2000) writes an undergraduate dissertation focussing on rhoticity in the phonology of Blackburn, Accrington and Burnley speech and Austin (2007) writes an undergraduate dissertation on the decline of rhoticity in East Lancashire. However, Vivian and Austin's work is not widely accessible, and there is less published material on East Lancashire varieties than there is for the varieties of English spoken in urban centres in the north of England, such as Liverpool or Newcastle. Despite this lack of available data, there are references in many textbook accounts of dialectology (e.g. Wells 1982, Trudgill 2000) to the fact that East Lancashire speech is still rhotic, unlike that in surrounding dialect areas in the north of England. These textbook accounts also suggest that the geographical spread of rhoticity may become even more restricted in the future, or that rhoticity will be completely lost due to dialect diffusion or levelling from surrounding areas. Foulkes & Docherty mention that, in England, speakers of rhotic varieties are 'often subject to ridicule' and that 'it is no surprise to find that non-rhoticity is encroaching on traditionally rhotic areas ... especially urban areas' (2007: 65). The first aim of this research, therefore, is to provide some accessible evidence of the current patterning of rhoticity in East Lancashire speech, and to investigate the possible impact on East Lancashire speech of the large, urban, non-rhotic community of speakers found in Greater Manchester, which lies immediately to the south of the East Lancashire area.

The second reason for gathering data from East Lancashire speakers concerns the phonological process of *r*-sandhi, which, as discussed in Chapter 2, is typically assumed to be in complementary distribution with rhoticity. Given that early 21st century East Lancashire speech may be

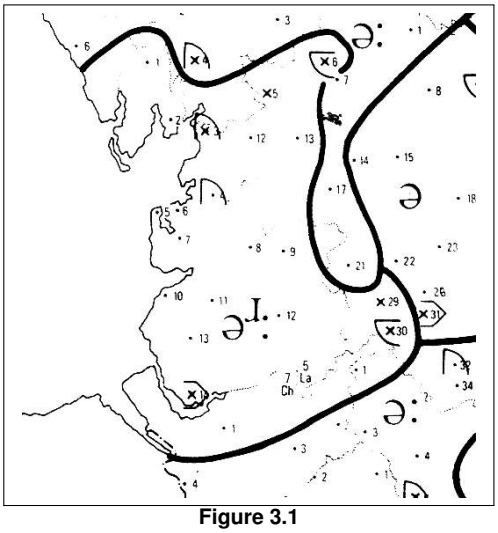


Figure 3.1
Rhoticy in *third*. (Orton et al. 1978)

undergoing a loss of rhoticity, this variety should provide useful data for investigation of the distribution of rhoticity and *r*-sandhi, and study of East Lancashire speech could potentially contribute to the wider issue of categoricity versus gradience in phonological systems.

Section 3.1 outlines evidence about Lancashire rhoticity from dialect studies. Section 3.2 contains information about the history and geography of the East Lancashire area, which is relevant when discussing the speech of the inhabitants of that area.

3.1 Dialectal evidence of rhoticity in Lancashire speech

Lancashire phonology shares many common features with the phonologies of other northern English varieties: there is no FOOT-STRUT split for example, and BATH has a short TRAP vowel. However, rhoticity is frequently referred to as a key phonological feature of Lancashire speech. This is clear from dialect data, such such as the isogloss in Figure 3.1 where the rhotic area is a very close match to the pre-1974 county of Lancashire. This map is a visual representation of data gathered in the *SED* in the 1950s from non-mobile older rural male speakers (referred to as NORMs by Chambers & Trudgill 1998: 19–20). However, most accounts of accent variation in England agree that late twentieth century Lancashire rhoticity is now quite geographically restricted. Writing in 1982, Wells acknowledges that, although the 1950s *SED* data show an *r*-coloured vowel 'throughout Lancashire', '[m]ost urban Lancashire speech (including under "Lancashire" the modern counties of Merseyside and Greater Manchester) is not rhotic' (1982: 368). He goes on to suggest that 'the patch of residual urban rhoticity, ever shrinking under the pressure of the non-rhotic majority, now seems to be located to the north of Manchester, in

Figure 3.2
Modern Dialect Areas (Trudgill 2000: 65)

places such as Rochdale and Accrington. It remains also in the country areas around Preston and the north of the county' (1982: 368). Trudgill also argues that rhoticity is geographically restricted: he presents a map of 'Modern Dialect Areas' (Figure 3.2). Here, the area labelled as 'Central Lancashire' is differentiated from its neighbouring areas on the basis of retention of rhoticity (Trudgill 2000: 56). This area of rhoticity has become smaller compared to the rhotic area in Figure 3.1. The fact that this small area of rhoticity is surrounded by non-rhotic areas, both urban (Greater Manchester and Merseyside to the south) and rural (North Yorkshire, northern and western Lancashire and Cumbria) is commented on by other writers: Britain refers to 'an island of rhoticity surrounded by urban and rural non-rhotic varieties' (2002a: 56).

As well as giving evidence from dialect surveys and atlases, writers often note that speakers of northern English varieties are aware of the association of rhoticity with Lancashire speech. For example, Wells writes: 'Lancashire accents are popularly supposed to be rhotic. Yorkshire people often think of this as a typical distinguishing feature between their own speech and that of their rivals on the other side of the Pennines: white rose /ˈfaːmə/, red rose /ˈfaːrmər/' (1982: 367). According to Ellis, the *r* in '*yard*, *hear*, *turn* and so on' is 'sounded heavily by

actors or comedians wanting to emphasise the Lancashire connection' (1968: 20). This type of 'folk-linguistic' knowledge does not always match the results of linguistic surveys; although Lancashire may be popularly supposed to be rhotic, most of the geographical area of the county is non-rhotic. This non-rhoticity includes speakers from rural and urban areas, which goes beyond Wells' label of 'urban Lancashire speech'.[1] Writing about industrial and economic history, Freeman et al. mention 'a contrast of startling clarity between the line of cotton-weaving towns which fills the Blackburn-Burnley lowland and the wooded rural landscapes of the Ribble valley scarcely 5 miles to the north' (1966: 225). They even go so far as to describe 'two Lancashires, divided by one of the sharpest economic boundaries in Great Britain' (1966: 225). It would seem that this economic and geographical boundary may well match an isogloss showing the current extent of Lancashire rhoticity.

Certainly when it comes to perceptual dialectology, the idea of two Lancashires is an issue when using cover terms such as 'Lancashire dialect': which 'Lancashire' is being referred to? However, even when the label is qualified and the traditional rhotic variety of Lancashire speech is specified, similarities in the distribution of certain features in East Lancashire and West Yorkshire speech exist. Ellis, who was one of the fieldworkers for the *SED*, points out that rhoticity 'begins to be heard on moving into the hills from Huddersfield' (1968: 20), and that its occurrence varies across Lancashire. The title of Ellis' 1968 paper is 'Lancashire dialect and its Yorkshire subsidiary' and while this is clearly a humorous implication of a hierarchy with Lancashire above Yorkshire (which would presumably appeal to members of the Lancashire Dialect Society), the suggestion that Lancashire speech is similar to neighbouring varieties is a challenge to traditional folk-linguistic ideas. Ellis claims that linguists' arguments about the similarity of West Yorkshire and southern Lancashire dialects are likely to be 'ignored completely' because of 'the intense local rivalries between Lancastrians and the Yorkists' (Ellis 1968: 18). Interestingly, Ellis writes that 'the age old rivalry of the red and white roses was never a geographical one and there were many Yorkshire supporters of the house of Lancashire and vice versa' (1968: 21). This reconsideration of how apparently 'geographical' labels such as *Lancashire* and *Yorkshire* should be used hints at arguments about *spatiality*, a term found in recent geographical studies,

1. Having lived for many years very close to the north of Lancashire, I think that the rural north of the current county of Lancashire is almost entirely non-rhotic, and this is also true of 'Lancashire over the sands', which is now part of Cumbria. Certainly, when I taught school pupils from the north of Lancashire (Lancaster, Morecambe, Carnforth etc.), they were quick to ridicule the speech of pupils who had recently moved from rhotic areas of the county, which matches Foulkes & Docherty's claim about the stigma associated with rhoticity in England (2007: 65).

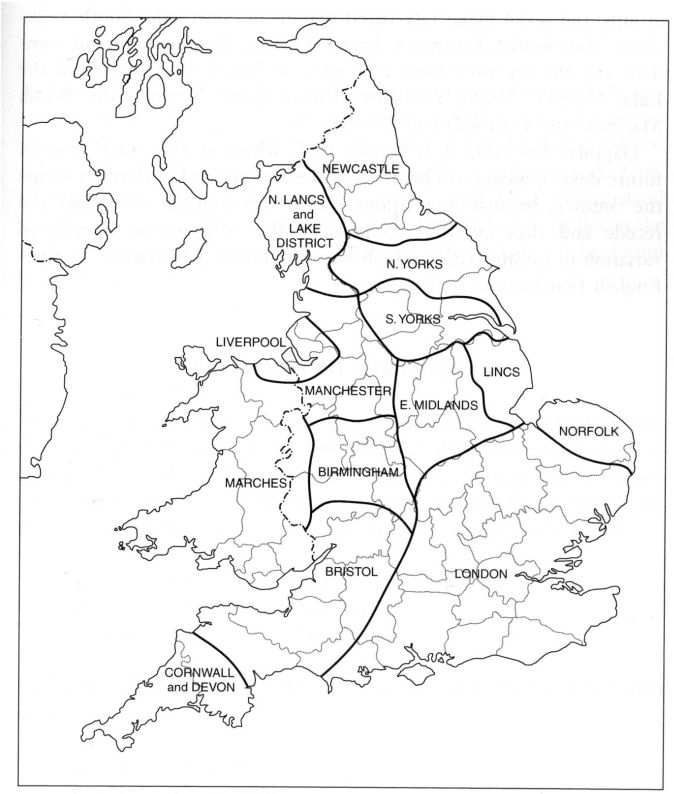


Figure 3.3
Possible Future Dialect Areas (Trudgill 2000: 83)

which combines Euclidean 'space' (points on a map) with people's social space, determined by their activities, and their perceived space, which reflects their conception of what is 'local'. Glucksmann writes about the development of spatiality in geography (see 2000: 131) and Britain applies it to dialect research in the Fens (2002b: 606). I discuss this socially-constructed space in relation to my East Lancashire survey in Chapter 6.

Another indication of the similarity of Lancashire speech to some of the surrounding varieties is Trudgill's map of 'Possible Future Dialect Areas' (Figure 3.3). The boundary lines on this map suggest that the pressure from surrounding non-rhotic speakers, mentioned by Wells, will lead to a broad dialect area 'focused on' Manchester (Trudgill 2000: 83). Trudgill writes that if rhoticity 'disappears altogether, Central Lancashire will differ from Northwest Midlands only in lacking diphthongs in *made* etc' (Trudgill 2000: 71). The fact that he groups Central Lancashire and Manchester in his map of future dialect areas despite the fact that some realisational differences may remain (monophthongs versus diphthongs in the FACE and GOAT lexical sets) again suggests that, for Trudgill, rhoticity is a defining feature of Central Lancashire speech: the loss of rhoticity would be enough for the area to disappear from the map. This is

something of an oversimplification though: other features, such as definite article reduction to [θ] preconsonantally (Shorrocks 1998) are also restricted to Central or East Lancashire[2].

Trudgill's dialect map predictions are fairly controversial: Wales (2006b) questions some of the implications of Figure 3.3, including the choice of labels for each area on the map. She notes that the 'Newcastle' area includes includes all of the north-east of England from Middlesbrough to Berwick, and agrees that this seems to match both 'popular mental mappings' (2006b: 205) and linguistic evidence. She mentions that her students treat 'Geordie' and 'North-east' as synonyms, and that recent evidence suggests that younger speakers from Middlesbrough and Berwick are apparently adopting certain features associated with Newcastle. However, other areas are not labelled with the name of a large city: while Wales allows that this is understandable for largely rural areas such as Trudgill's 'N. Lancs and Lake District' and 'N. Yorks', she wonders whether the significance of conurbations such as Leeds, Bradford and Sheffield may be 'hiding' (2006b: 204) under the label 'S. Yorks'. The inverse may be true in the case of Trudgill's 'Manchester' area: locally significant areas, including perhaps a semi-rural East Lancashire area, may be hidden by the 'Manchester' label. In the abstract for a conference paper, Wales mentions that 'the decline and disappearance of English dialects generally has been predicted for well over one hundred years' and that certain 'models and metaphors ... need to be "refreshed", since they can blind us to potentially significant phenomena which indicate a more positive situation' (2006a). The choice of words here, 'a more positive situation', suggests a judgement about the value of dialectal diversity, namely that it is a good thing that it continues to exist. Wales' comment also seems to match the idea that the area labels on maps such as Trudgill's are not neutral and may hide important points about particular dialect areas: an idea which is certainly shared by some non-linguists from Lancashire. When it is suggested to people in Central Lancashire that the dialect spoken there is predicted to become essentially the same as a Manchester dialect, the idea is usually dismissed as wholly unlikely, as is suggested by the following extract from two younger Accrington speakers (the speaker labels are explained in Section 5.1.2).

(3:1) **Acc5:** I don't think I sound Manc! No.

Acc4: No. I don't think we're ... close.

Acc5: I think they sound quite a lot different than us.

2. Definite article reduction to [ʔ] or to ∅ is of course more widespread and is found in Yorkshire and other parts of the north of England as well as Lancashire, see Jones (2002).

Acc4: I do!

Acc5: I don't understand how we would . . . change.

(Acc4&Acc5_Conversation.wav 42:20–42:38)

Wales mentions this idea in relation to the distinction between Liverpool and Manchester speech; although the varieties do share 'a Lancashire base' (Wales 2006b) they are so distinctive that 'no one in the North is likely to place a Mancunian as a Liverpudlian' (2006b: 205). However, given that Trudgill acknowledges that no-one 'from Middlesbrough would mistake a Tynesider for someone from Middlesbrough' (2000: 81), yet those places are placed in a single 'Newcastle' area on his map, it might be argued that the 'Manchester' label hides the possibility that, say, Blackburn speech may still be distinct from Manchester speech. Wales makes a point that dialect is used by communities not only to signal group identity, but also to signal difference from other groups (2006b: 205, see also Kaufmann 2010: 489). She mentions that inhabitants of Liverpool may be developing stronger accents (the pattern of divergence from supra-local levelled variety shown in Watson 2006) 'precisely because they are determined to sound distinctive' (2006b: 206). Research into the speech of Bolton and Salford adolescents suggested a similar phenomenon (Barras 2006), and it may well be that speakers in Accrington and Blackburn could continue to maintain rhoticity partly as a means of distinguishing themselves from speakers from Manchester.

Although there is clearly some debate about Trudgill's predictions of future dialect areas, his account of the present day situation seems much less controversial. In East Lancashire, there is effectively a small island of rhoticity surrounded by non-rhotic speakers in both urban and rural areas. The next section describes the geography of this area, together with some information about the area's industrial history and its current status, including transport links to Manchester.

3.1.1 Evidence from southern Lancashire speech in the mid 20th century

There is a great deal of evidence of rhoticity in Lancashire speech surveyed in the *Survey of English Dialects* (Orton & Halliday 1962). This is often transcribed as [ɹ], or as a rhoticised vowel, or, frequently, both:

(3:2) *barn* [baˈːɹn] (I.1.11 La2)[3]

There are some examples of variable rhoticity:

(3:3) *garden fork* [gaːdɪnfɔˈːk] (I.7.9 La6)

3. The numbering is as per the questionnaire for the *SED*, printed in Orton (1962).

Some transcriptions of Lancashire speech match what would be expected from a non-rhotic speaker in terms of the lack of a coda-*r* and the presence of linking-*r*:

(3:4) *gear it up afore you can* [gɪəɹ ɪt ʊp əfʊə jə kən] (I.5.1 La3)

Most of the examples in the *SED* data are isolated citation forms. Even in the short phrases of connected speech that have been transcribed there is little evidence of *r*-sandhi, and I have found no evidence of non-etymological *r*-intrusion. The next examples show at least some rhoticity, but as would be predicted, no *r*-intrusion:

(3:5) *saw horse* [sɔː ɔᴵːs] (I.7.16 La4)

(3:6) *furrow-horse* [fəɹə-ɔᴵːɹs] (II.3.4 La11)

(3:7) *furrow-horse* [fɒɹə-ɔᴵːs] (II.3.4 La13)

(3:8) *furrow-horse* [fʊɹə-ɔᴵːs] (II.3.4 La14)

The use of a hyphen in some of these examples seems to reflect the orthography of ⟨furrow-horse⟩ rather than making any point about the nature of the transition between the two vowels on either side of the hiatus. The same *furrow-horse* question results in the pronunciation [fʊəɹɔᴵːs] in La1, La2 and La3. This pronunciation is difficult to parse; it could reflect an intrusive-*r*, but on the other hand [fʊəɹ] could be an elided form of *furrow* such that the surface [ɹ] is a realisation of the medial /ɾ/, in which case this is not a sandhi intrusive-*r*. I have found no evidence for word-internal *r*-intrusion at morphological boundaries (in forms such as *drawing* etc.)

The basic materials of the *SED* show some rhoticity in other areas too, including Northumberland. Here too, potential instances of intrusive-*r* are vanishingly rare in the responses to the questionnaire, and when potential sandhi contexts do occur, there is no evidence of intrusive-*r*.

(3:9) *claw each other* [klaː itʃ ʊðɔᵝ] (VI.2.8 Nb3)

(3:10) *draw its* [dʁaː əts] (IV.6.20 Nb1)

(3:11) *draw his* [dʁaː ɪz] (IV.6.20 Nb2,Nb5)

So, the evidence of connected speech in the *SED* supports the standard view that rhotic speakers do not produce intrusive-*r*.

3.1.2 Evidence from southern Lancashire speech in the late 20th century

Shorrocks (1998) describes the extent of rhoticity in his corpus of Bolton speech, most of which was recorded in in the 1970s and 1980s. Although there is rhoticity in his data, it is variable across speakers and within the speech of individuals. He writes that while rhoticity is still found

as part of vernacular Bolton speech, 'speakers of traditional vernacular with no or little trace of [coda] /r/ are nowadays not uncommon' (Shorrocks 1998: 388). Furthermore, many speakers' use of coda /r/ is 'unsystematic and unpredictable ... Whether a sociolinguistic analysis might contribute to our understanding has yet to be established. /r/ is not such an obvious shibboleth in England as /h/' (1998: 389). In terms of geographical variation, Shorrocks writes that 'it is probably fair to say that, in the outlying, more countrified districts on the outskirts of the area, final and pre-consonantal /r/ is more extensively used than in the urban parts' (1998: 389). This would of course fit with the idea that there is a move towards loss of rhoticity and that urban speakers are likely to be further on in the this process.

In terms of *r*-intrusion, Shorrocks notes that it does occur in certain contexts:

(3:12) *'No,' I says* /næːr a sɛz/

(3:13) *Grandma and* /ɡranmər ɵn/[4] (Shorrocks 1998: 393)

These examples are interesting: from Shorrocks' account of variable rhoticity it would seem possible that some speakers are at least variably rhotic, yet also have *r*-intrusion in a phrase such as *Grandma and*. Shorrocks also writes that '/r/ may *not* appear as a linking /r/ after /ɔː/ whereas it sometimes does in RP' (1998: 393). This statement is intriguing: Shorrocks appears to mean both etymological and non-etymological *r*-sandhi when he talks about 'linking /r/' in this context, given that he refers to Gimson's description of 'linking' in RP which includes etymological and non-etymological examples under this heading (see the revised edition of Gimson, Cruttenden 2001: 288–9). Perhaps there is some link between this and Wells' comments that intrusion after [ɔː] is more stigmatised because it is a later development in London English and RP than intrusion after [ɑː] or [ə]. Shorrocks' use of 'linking' suggests that no *r*-sandhi is found after /ɔː/ in linking contexts such as *sore arm*. Interestingly, Williams & Kerswill (1999: 147) also note that both linking and intrusive-*r* are 'rare in Hull after /ɔ/', despite being the norm in other *r*-sandhi contexts.

In a B.A. dissertation, Vivian (2000) reports that rhoticity is robustly maintained in Blackburn and Accrington and is found in lower levels in Burnley. Referring to Vivian's research, Britain describes Accrington as being 'situated on an island of rhoticity surrounded by urban and rural non-rhotic varieties' (Britain 2004: 44). Austin (2007) examines the status of rhoticity in Rossendale and Burnley and finds a similar pattern, with levels of coda-*r* being higher in

4. /ɵ/ is a close-mid central rounded vowel, which Shorrocks argues is a phoneme in Bolton English.

Rossendale than they are in Burnley. He refers to the Rossendale area as the 'rhotic heartland' (Austin 2007: 3), and the greater decline of rhoticity in Burnley is attributed to Burnley's more marginal position relative to the island of rhoticity.

3.2 The history and geography of East Lancashire

3.2.1 The geography of the area

The rhotic area of Central Lancashire, sometimes also labelled East Lancashire, consists of small to medium sized former mill towns with rural areas in between them. This area of reported potential rhoticity extends from the northern edge of the Greater Manchester conurbation, in places such as Prestwich and Bury, to the large towns of Blackburn and Burnley, some twenty miles further north. In between are the smaller towns of Ramsbottom, Haslingden and Rawtenstall (which together form part of the Rossendale district) and Accrington. Writing in 1968, Ellis mentions ribbon development along roads in both West Yorkshire and East Lancashire that 'makes the traveller feel that he never leaves town at all' (1968: 18). He mentions that 'the existence of any agricultural land is far from apparent' along 'the Wigan-Warrington-Oldham-Rochdale-Blackburn routes' (1968: 18). Although this is perhaps a slight exaggeration (Ellis qualifies his claim slightly by specifying that it applies 'on a dull day'), it is true that the distances between the East Lancashire towns I have mentioned are small. Figure 3.4 shows that it is 15 miles as the crow flies from Prestwich to Accrington. However, it is important to note that the physical geography of East Lancashire does affect the actual distances for journeys between these towns. The area consists of steep-sided valleys with high, inaccessible moorland between them, and, certainly historically, this will have affected the ability of people to travel between towns that appear close together on a map. Despite these obstacles, the distances are small, and so models of 'regional dialect levelling' (Kerswill 2003: 224) might predict that non-rhotic Manchester speech would, over time, spread northwards. According to these models, the smaller towns would be influenced by Manchester because of their much smaller populations, as compared to the large conurbation of Manchester (see Table 3.1).

Accrington is often mentioned in the literature as being a place where rhoticity is retained consistently, despite the proximity of non-rhotic speakers in surrounding areas. Vivian's research is mentioned by Britain (2004: 44, 2009: 133) and by Foulkes & Docherty (2007: 65); Heselwood et al. (2008) uses recordings of Accrington speech in a discussion of auditory and acoustic methods of assessing rhoticity. Given the focus on Accrington as a rhotic 'island'

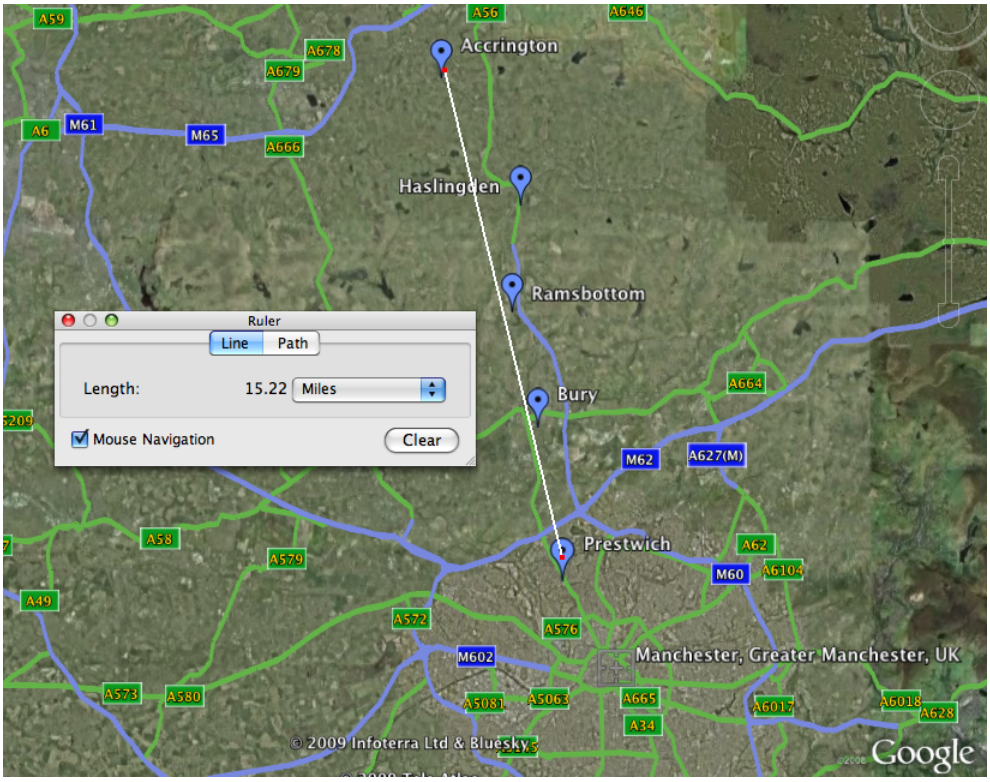


Figure 3.4
Towns in East Lancashire

Locality	Population, 2001 Census
Accrington	35,203
Haslingden	16,849
Ramsbottom	14,635
Bury	60,718
Prestwich	31,693
Manchester	458,100

Table 3.1
East Lancashire population data from the 2001 Census. The 'Manchester' figure refers to the City of Manchester rather than to the whole Greater Manchester Urban Area, which has a population of 2,240,230 in the 2001 Census (and which would include Radcliffe, Bury and Ramsbottom). The figure for Haslingden does not include Rawtenstall, Helmshore or Waterfoot which, together with Haslingden, form a small Rossendale conurbation, with a population of 65,652 in 2001.

as discussed above, is therefore a location where rhotic speakers are predicted to be found. Indeed, if the island metaphor is accurate, then travelling in any direction should involve leaving the 'island' and entering a figurative sea of non-rhoticity. However, the physical geography of this area is an important consideration: this part of East Lancashire is on the fringes of the northern Pennines and is characterised by steep-sided valleys. While there are routes over the high moorland between these valleys, these roads were historically narrow and winding, and often impassable in winter conditions; this situation is little different today. Most travel, by main roads and railways, takes place along the valleys. So although there may be non-rhotic speakers

in every direction, in order to investigate the potential for dialect contact to influence linguistic change in East Lancashire, I thought it sensible to find locations between which people can travel easily. The northern suburbs of Manchester are twenty miles south of Accrington, and, as would be expected from Britain's comment above, are characterised by non-rhotic speech.

The matter of how Manchester influences its outlying areas is not straightforward. Northern suburbs of Manchester such as Prestwich, Whitefield and Radcliffe seem to be more clearly part of 'Manchester' than are larger and more independent towns within the Greater Manchester area (this intuition is supported by comments made by my participants, such as the exchange in example 6:4 (p. 203) in Chapter 6). Technically though, the suburbs I mention above are part of the Metropolitan Borough of Bury, so there is a degree of ambiguity about the extent of influence of Manchester. The perception of towns such as Bury by their inhabitants and by outside commentators is mixed. Deas & Ward (2002) claim that 'the towns of Bolton, Bury, Rochdale, Oldham, Ashton, Stockport and Salford grew as distinct nodes within this broader integrated "industrial region" . . . linked but separate towns' (2002: 116). Bee claims that 'by the middle of the nineteenth century, these towns were so close together and had so much in common that we can consider each of them part of a single entity–a giant Manchester' (Bee 1984 quoted in Taylor et al. 1996: 49). This notion of being not only linked parts of a giant Manchester, but also separate entities, persists today. In 1997, Manchester City Council were involved in the setting up of an organisation called Marketing Manchester, which aimed to co-ordinate the promotion of Manchester in the private and public sectors. A set of guidelines for advertising agencies explains that 'the whole "city-region" will be referred to as Manchester' but this will require a campaign to 'inspire support for a potentially difficult concept e.g. for a lifelong resident of a town such as Oldham to be proudly projecting the area as part of Manchester' (Marketing Manchester 1996, quoted in Deas & Ward 2002: 130). Taylor et al. claim that 'the idea of being a citizen of somewhere called Greater Manchester was always weaker than the sense of identity that comes from birth or residence in individual towns . . . across that conurbation' (1996: 77). This would suggest that there might be a shift of identity from 'more Manchester' in smaller suburbs of Manchester itself, to 'less Manchester, more separate town' in a town such as Bury. Even further out from Manchester, in a smaller town such as Ramsbottom (which is still just inside the Greater Manchester region) one might expect even less of a direct identification with Manchester and more of a distinct identity.

There are currently good road links along the Manchester-Bury-Ramsbottom-Rossendale-Accrington route: the A56 and M66 allow a journey from Accrington to Manchester to be made in 30 minutes. Furthermore, public transport is also well-provided along this route. The bus service to Manchester even has its own brand-name: 'The Witchway' (a reference to the Pendle Witches associated with Pendle Hill, which is alongside part of the route). The website for The Witchway (Transdev Burnley & Pendle 2009) shows that there are over fifty journeys a day between Nelson and Manchester, and that the service runs every twenty minutes during the day. The availability of these transport links means that it is possible for people to commute from various East Lancashire towns to work in Manchester (see Section 6.1.2). A proportion of the present day population of places such as Haslingden do commute to work in Greater Manchester (one of my older Rossendale speakers, Ros7, referred to one of the local housing estates as making the area into a 'dormitory town now, like the others closer to Manchester used to be' (Ros7_conversation.wav, 11:21–11:26)). However, for most of the nineteenth and twentieth century, employment in East Lancashire towns was much more local, and was dominated by the cotton industry. Although more recent, post-industrial economic factors may well be relevant in conditioning the living and working patterns for younger inhabitants of East Lancashire, it is certainly true that many older inhabitants of East Lancashire towns worked in the cotton industry between the 1940s and the 1960s, and so an understanding of the history of this industry will play a role in understanding their social practices. Furthermore, the industry had such a large effect on the development of towns in East Lancashire, in terms of housing and the provision of public buildings, that its influence is still important even after it has disappeared.

3.2.2 The industrial history of East Lancashire

The cotton industry is widely acknowledged to be a key influence in the history of Lancashire during the nineteenth and twentieth centuries. Indeed, Huberman writes in his preface: 'Another book on the cotton-textile industry? The wealth of studies on the industry is legendary. From its inception as the first factory industry, the cotton-textile industry in Lancashire has been the source of scholarly attention and controversy' (Huberman 1996: xiii). Much of the literature on the cotton industry documents its rise during the nineteenth and early twentieth centuries, and its decline and collapse during the twentieth century. Singleton writes a chapter called 'When Cotton was King' and has a section called 'THE REIGN OF KING COTTON, 1780–1920' (1991: 1), which provides some dates between which the process of industrialisation had a large effect on

the types of community that developed in the mill towns of East Lancashire. The developed factory system resulted in quite a high degree of control by the mill owner over the workforce (Rose 1996: 11). If most employment in a town was centred on one mill, and indeed if much of the housing in the town was provided by the mill owner, it might be expected that people did not need to travel to other places, and that the population may have become somewhat insular. For example, Irwell Vale, which now forms part of Helmshore in Rossendale, was built 'as a speculation' (Aspin 1996: 339) in the first decade of the nineteenth century. A merchant, John Bowker from Prestwich in Manchester, built a water-powered mill and thirty stone houses in order to lease them to a cotton spinner. In this case neither the owner of the mill nor the owner of the cotton business who rented it 'appears to have taken much interest in the social life of the workpeople' (Aspin 1996: 340), probably because 'almost all of [the workers] were self-motivated Primative Methodists' (1996: 340). However, Aspin describes how a tightly-knit local community developed such that by the end of the nineteenth century Irwell Vale had 'its own chapel, co-operative store, newsroom, temperance society, mutual improvement class and burial club' (1996: 340). Despite the status of Irwell Vale as effectively a new-town, whose population would have moved there from surrounding areas of East Lancashire, it would seem that once it was established its inhabitants had no need to travel to neighbouring settlements. Clearly, the social practices associated with the East Lancashire cotton industry limited the amount of linguistic contact and mixing that the East Lancashire population would undergo.

The cotton industry shaped the day-to-day working lives of its employees to a large degree. From 1850 the working week was restricted to 60 hours: in practice, this meant that cotton operatives would work from 6am to 6pm (with breaks for breakfast and lunch, which were not counted as working hours) (Fowler 2003: 59). The early start was favoured by mill owners to prevent workers from being tempted by the beer shops and pubs, which themselves opened at 6am (Fowler 2003: 60). With Sundays being 'controlled by religious convention' (Fowler 2003: 65), and the working week being controlled by the working hours of the mills, Saturday afternoons became the only real 'escape from work' (Fowler 2003: 65) for cotton workers.

During the second half of the nineteenth century, mass spectator sports such as football and cricket developed, and Lancashire towns were well represented by teams. Blackburn, Burnley, Preston, Bolton and Accrington joined the football league when it was formed in 1888, and provided a community focus for inhabitants of these towns (Fowler 2003: 66). Although football

quickly became a professional game, league cricket allowed smaller towns to play a more prominent part than they did in football: small towns including Rawtenstall, Haslingden and Accrington fielded teams against larger towns such as Blackburn and Burnley (Fowler 2003: 67). Furthermore, players had to have been born or be resident in the town they played for, ensuring a local focus for supporters of the teams (Fowler 2003: 68). Again, while it is important to avoid leaping to simplistic conclusions about the amount of exposure the the East Lancashire population had to speakers of other dialects, all of these pieces of evidence point towards a local social focus, different in scale from other parts of Britain during the industrial revolution. The East Lancashire population did not have to move, en masse, to cities in order to find work in factories: because of the local resources (water power for the early mills, nearby coal fields for later steam-powered machinery) the cotton industry came to them. This local social focus provides an example of the type of 'self-perpetuating socio-geographical "grooves"' (Britain 2010: 154) which can shape linguistic behaviour.

The cotton workers had yearly holidays: a formal agreement about unpaid holidays came into effect in 1907 (Fowler 2003: 63), but in practice the system of 'wakes weeks' had developed much earlier, arising from the need for mills to close down each year in order for boilers and other machinery to be serviced. Mills in different towns would shut down in different weeks, so that 'from June to September of each year one of the main Lancashire towns was on holiday' (Fowler 2003: 63). Again, the operation of the cotton industry influenced the social behaviour of inhabitants of East Lancashire: although the workers were able to save enough money to travel to the seaside (typically Blackpool), in practice the whole community would be on holiday at the same time, and so the local focus of community life would continue even while the workers were on holiday. Even when East Lancashire mill workers did travel, there would still be a large degree of local language contact to balance any exposure to speakers of different dialects.

Even though the cotton industry was in decline from the 1920s onwards (and by the late 1940s was 'not worth saving' (Singleton 1991: 232)), it continued to shape the lives of Lancashire people. Glucksmann notes the detailed accounts of local life given by her interviewees, most of whom were born just before 1920 in mill towns around Manchester: '[l]ocalism seemed central to every dimension of their existence and also to structure their understanding of life. They gave highly articulate accounts of local culture and tradition' (2000: 146). The highly local nature of her interviewees' world-view is also noted: Glucksmann explains that they 'seemed not to have

been familiar with the very different, but apparently equally immutable, local customs or with the different job opportunities in towns less than 15 miles away' (2000: 146). She mentions that some of the women she interviewed in Oldham described how they had worn out their shoes by walking from mill to mill during the 1930s looking for work. She notes, though, that they 'did not even consider travelling the 20 minutes to look for work in Manchester where unemployment was comparatively low and a variety of jobs were available for young women. Their horizons were restricted to a few miles only' (2000: 146). This point is interesting because transport links did exist from the mid-nineteenth century on. Although in the early nineteenth century the north east of Lancashire was 'remote from the focus of the growing cotton industry in the Manchester lowland, with which it was linked only by road and, circuitously, by the indirect course of the Leeds and Liverpool canal' (Freeman et al. 1966: 209), there were 'improved rail connections after 1847' (Freeman et al. 1966: 209) which allowed for increased industrialisation and links with Manchester. Indeed, despite the remote nature of the East Lancashire towns, there was a flurry of railway building in the 1840s. Freeman et al. mention that the East Lancashire Railway Company opened a line in 1846 'from Clifton Junction ... on the Salford–Bolton line, to Bury, Ramsbottom, and Rawtenstall along the Irwell valley' (1966: 88). In 1848 another line was built 'from Stubbins, less than a mile north of Ramsbottom, to Haslingden, Accrington, and Burnley' (1966: 88). As quite a dense railway network developed, its effect was to support and strengthen the cotton trade in East Lancashire: 'yarn could easily be transported from the spinning area around Manchester to the weaving area around Burnley and Blackburn' (1966: 88). Now, the availability of these railway links does make an interesting juxtaposition with the very strong sense of localism noted by Glucksmann. It seems as though industrial materials such as cotton yarn were much more likely to be transported on trains around East Lancashire than were the cotton workers themselves. These rail links continued until the Beeching cuts of the early 1960s, and many of the closed lines were dismantled with sections of the land being sold off. While the East Lancashire Railway does still exist, it is a heritage railway which was reopened in 1991 by the East Lancashire Railway Preservation Society, and runs steam train services between Bury and Rawtenstall (The East Lancashire Light Railway Co. Ltd. 2009).

Glucksmann suggests that although her interviewees may well have had practical reasons for having such a local focus (the cost of transport, or the nature of work available) 'no reasons were offered, as though explanation was unnecessary' (2000: 146). The explanation supplied

by Glucksmann is that if her interviewees were aware of alternative opportunities for work, they may have discounted them 'because they were not in Oldham' (2000: 146). Given that people's linguistic behaviour may well be linked to other aspects of their social behaviour, it may be the case that there really was little contact between inhabitants of mill towns even though the distances between these towns were small. Considering contact-based theories of sound change and dialect levelling, this relative lack of contact could explain the resilience of a traditional dialect feature such as rhoticity. It could also be the case that the 'horizons' of people's world-view mentioned by Glucksmann also affected people's linguistic behaviour: their local focus may have meant that they would not have wanted to sound like people in neighbouring towns, even if they did know what these other people sounded like.

Shorrocks (1998) notes similar social practices in nearby Bolton in the early twentieth century. He presents several extracts from his interviews and reports that 'a picture emerges, then, of poor roads, and little travel, with people having neither the money nor the inclination to travel' (1998: 19). The small distance to the city of Manchester, as with Glucksmann's findings, seems to have been a large gulf for Boltoners: 'one informant oberved that, if you were one of the half dozen travelling from Little Hulton to Manchester each day, then you were "a wide-eyed boy, or a man of the world, or something"' (Shorrocks 1998: 19).

The emphasis and extended comment that both Glucksmann and Shorrocks give to this local focus in Lancashire towns suggests that this is not a universal feature of the small town hinterlands surrounding large cities. In other areas of the country there may have been a different situation, in which people were much more likely to look to the city for work and as a wider focus of social attention: the fact that this was apparently not true for inhabitants of Lancashire towns is clearly of interest to Glucksmann, and is potentially a significant factor in the linguistic situation in Lancashire as well.

Writing in 1966, Freeman et al. discuss the prospects for the cotton and coal industries. Some of their predictions have not been borne out. They suggest that 'a reconstructed cotton industry may well have a permanent place in the industrial life of the Lancashire coalfield, and so, too, will a reorganised mining industry' (1966: 224); both cotton and coal have since undergone drastic declines, and cotton was already much reduced by the 1960s. However, even as late as 1966, Freeman et al. write that 'the old economy lives on in the remoter towns of the uplands and their flanks, like Rochdale, Burnley, and the towns of Rossendale' (1966: 224).

They write that 'for almost two centuries Rossendale has lived by its cotton manufacture and by very little else' (Freeman et al. 1966: 211). They mention possible reasons for the lack of development of new industries: 'remoteness and poor communications, perhaps also the "weeping" climate and the gloomy, cramped appearance of the valley towns, have combined to repel new enterprises' (1966: 224). Indeed, they even go so far as to question the very existence of towns in Rossendale in the future:

> Some would question whether the crumbling economy of such a region should be artificially sustained. Rossendale's valleys are frost pockets in winter, and the sun is prevented by their high walls from piercing the persistent inversion fogs. The urban fabric of these towns is becoming worn out and obsolete, and housing conditions are seriously sub-standard: not only back-to-back but also back-to-rock dwellings are to be found in them. Yet the corporate and community life in these old closely knit communities is far richer than in many new housing estates. (Freeman et al. 1966: 224).

This list of negative points about the Rossendale towns suggests that Rossendale is not only a potential site of dialect death, but also of wholesale abandonment of the settlement as the population could move to more pleasant areas in search of work and better housing. However, Freeman et al. do mention the strong sense of local community in Rossendale, which matches Glucksmann's findings about the strength of local identity.

Glucksmann also discusses the decline of the Lancashire cotton industry. This was well underway by the 1930s, but was not replaced by any major new industries (unlike, for instance, in London and the South East). She argues that this '[a]bsence of renewal undoubtedly contributed to the strong sense of the past of places expressed by so many' (Glucksmann 2000: 154). This suggests that space and time are closely connected: social and linguistic conservatism may be linked both to a small geographical outlook and a focus on the past. Glucksmann mentions 'the impossibility of thinking about spatial variation outside of a historical context' (2000: 162), and 'the spatial difference between Lancashire and London in the 1930s was entwined with the historical developments that also separated them' (2000: 162).

Moving beyond the collapse of the cotton industry, labelled by Sandberg as the 'disaster that overtook Lancashire' (1974: 224), in a discussion of the state of the economy in Lancashire in the 1990s Timmins (1998) tabulates the distribution of manufacturing and service sector jobs in

the North West, using data from the 1993 Census of Employment. He shows that the proportion of manufacturing jobs has drastically reduced over the twentieth century, due to the collapse of the cotton and coal industries. However, despite this overall reduction, he notes that 'despite the much diminished importance of manufacturing, it has remained well above the regional average in east and north-east Lancashire, approaching half in Pendle, [and] over a third in Burnley, Rossendale, Hyndburn, Blackburn and Tameside' (Timmins 1998: 320). He attributes this partly to the development of some alternative manufacturing industries in the wake of the demise of the cotton industry, but he also mentions 'the area's peripheral location, with incomplete motorway links' (Timmins 1998: 321) and the fact that East Lancashire has 'failed to develop a strong presence in higher education, a growth industry in several parts of the north-west since the 1960s' (Timmins 1998: 321–322). Both of these factors may contribute to the apparent linguistic conservatism of East Lancashire, reflected in the continued presence of rhoticity there despite its loss in other parts of Lancashire. While there are road links along the route from Accrington to Manchester, it is true that the motorway runs only as far north as Edenfield (just north of Ramsbottom), and that the journey further north to Haslingden and beyond involves the A56 (although this is a dual carriageway). The Witchway bus route is clearly a new venture: its website proudly boasts of 'a totally new travel experience for our customers' and buses with 'features never before seen in Pennine Lancashire' (Transdev Burnley & Pendle 2009). Although there have been previous bus services between Burnley and Manchester, the hyperbolic nature of the Witchway's website suggests that the frequency of service and the quality of the vehicles is a new development: 'At a cost of around £3 million this was a considerable investment, rewarding the loyalty of our existing customers on X43 and X44, and enabling us to attract new custom' (Transdev Burnley & Pendle 2009). The fact that the bus company is willing to make such an investment may suggest that there is a growing market for travel to Manchester, and that the intense sense of localism encountered by Glucksmann in her interviews is changing.

3.3 Summary

East Lancashire has become an island of rhoticity. Certain factors in the physical geography of the area, together with its industrial history, may have contributed to a degree of isolation and to a very 'localised' lifestyle. A socio-historical study of Lancashire female cotton workers highlighted a very local focus, with little desire or inclination to travel to places only short distances away from their home towns (Glucksmann 2000). It is reasonable to hypothesise that

the social behaviour of inhabitants of these East Lancashire communities may have affected their linguistic behaviour. Retention of rhoticity, which, as Trudgill's map shows, is a feature that has been lost across the rest of the north of England, may be linked to a particularly local social focus in parts of Lancashire.

Concepts such as 'sense of community' or 'localness' are hard to measure quantitatively. However, in analysing linguistic variation in East Lancashire in different age groups, some qualitative data about people's attitudes to their local town, the wider area, and to the much larger Greater Manchester conurbation may be useful in accounting for some patterns. In the interviews for this research project, a series of discussion topics was formulated in order to try to elicit this type of information (see Section 4.3), and the issue of local social focus is discussed in Section 6.1.1. In addressing RQ1 and RQ2, it is necessary to have an awareness of the types of social practices that have been typical in industrial Lancashire in order to make sense of the current patterns of variation in my East Lancashire data.

Despite the local social focus reported for Lancashire inhabitants, the small distances involved and changes in demographic patterns of working and commuting mean that there is the possibility of extensive dialect contact between speakers from the rhotic and non-rhotic areas. A certain amount of variability is likely in such contact situations. This is a potential problem given the binary distinction between rhotic and non-rhotic speakers assumed in the phonological theories discussed in Chapter 2. An issue to be returned to is whether a speaker with variable levels of surface coda-*r* can be regarded as phonologically rhotic with a variable realisation, or phonologically non-rhotic, again with variable realisation (some sort of insertion rule this time). A third possibility is that such a speaker could be switching between two systems, each one operating consistently, with the variation being explained by the switching between systems. All of these have implications for the use of *r*-sandhi by such a speaker.

Chapter 4

Survey Methodology

In this chapter I describe and explain the methods of data collection and analysis used in my survey. Previous empirical research on *r*-sandhi refers to the low frequency of intrusive-*r* in conversational speech (see Hay & Sudbury 2005: 812). Therefore, although I use a sample of recorded conversational speech data in this research, I also make use of structured reading and elicitation tasks in order to capture more tokens of (potential) *r*-sandhi and to try to ensure coverage of a controlled range of phonological contexts. I begin this chapter by explaining the design of a reading task and an elicited speech task, including the use of a small pilot study and subsequent refinement of the tasks. Next, I discuss the structured plans I use to shape the conversational section of the interview, which are designed in order to generate conversation, and also to elicit demographic information from my participants. Bearing in mind the social variables of PLACE and AGE necessary to address my research questions, I go on to discuss the organisation of my sample population of speakers in terms of the choice of locations for data collection and the selection of speakers to fill the sample. I discuss practical considerations in the use of recording equipment, including the use of a laptop computer in order to enable me to carry out a version of a commutation test during the interview. I also discuss issues in cataloguing and archiving the resulting audio files.

4.1 The reading task

Given the close focus on rhoticity and *r*-sandhi required by my research question, it was clear that some forms of elicited speech would be necessary in addition to spontaneous conversational speech. Contexts for *r*-sandhi do not occur very frequently, and so because I had only a limited amount of time to spend with each participant and wanted to be able to compare speakers' use of *r*-sandhi, I devised a set of sentences to be read out. This set contains contexts in which linking-*r*

and intrusive-*r* could be realised, together with instances of non-prevocalic etymological *r*, in order to allow me to quantify speakers' rhoticity.

4.1.1 The pilot study version

I created the first version of my list of sentences for a small pilot study. The basic approach was to try to cover all possible phonological contexts for both linking and intrusive *r*; however, certain vowels (ɜː, ɛː) do not canonically occur in the relevant pre-hiatus position in words which did not have a final /ɹ/ historically. Contexts for intrusive-*r* after these vowels, therefore, were missing from my first version. These vowels may well occur in natural speech though, in environments without an etymological *r*, in lexical items such as *yeah* [jɛː], or in a hesitation particle [ɜː], which is often represented orthographically as ⟨er⟩. In the context of British English orthography, I do not think this use of ⟨r⟩ implies /ɹ/; instead I think it is used to indicate a long vowel, as is claimed by Gick (1999: 35) (although his claim that there is a British/American distinction in *blar blar blar* versus *blah blah blah* is a generalisation: orthographic ⟨h⟩ in e.g. *blah blah blah* is frequently used to signify vowel length and quality (i.e. [ɑː] versus [a]) in British English too). Clearly, there is scope for confusion with respect to ⟨er⟩ as a prompt for a hesitation particle, especially when the same orthographic prompt is to be given to non-rhotic and rhotic speakers, as is discussed in the next section. In addition to these gaps in the sites of potential intrusive-*r* (after ɜː, ɛː), my first reading list was not balanced: there were fewer examples of sandhi contexts after /ɑ/ than after /ɔ/ or /ə/. So, although the first version of my sentence list did generate some interesting results, it was not systematic enough in its coverage of possible vowels.

4.1.2 The improved reading task

In the revised version of my sentences list, I tried to elicit potential intrusive *r* contexts even for vowels such as /ɜː/, which are unattested in this position, according to Giegerich (1999: 168). I used hesitation particles such as 'uhhh' to try to elicit /ɜː/, and was careful not to use orthographic conventions such as ⟨er⟩ which could confuse the issue of rhoticity and the use of [ɹ] as a hiatus filler. A spelling of ⟨er⟩ could suggest that the item was underlyingly /ɜɹ/, in which case one might expect rhotic speakers to realise the /ɹ/ in all cases regardless of what followed, and non-rhotic speakers to display linking-*r*. My use of uncommon spellings such as ⟨uhhh⟩ is clearly somewhat problematic: several speakers hesitated or stumbled over this, and

speaker ROS_OF3 even commented on it after the task saying that it should have been 'um': she clearly used something like /ɜːm/ as a pause-filler speech particle. However, my system is the best that can be formulated given the lack of attested lexical words ending in /ɜː/ with no historical final /ɹ/.

The plan for the revised reading list is shown in Figure 4.1. I aimed for three utterances per cell in the table in Figure 4.1. However, contexts for intrusive-*r* are difficult to find for some vowels: there are not many for /ɑ/ and the examples for /ɛ/ and /ɜ/ are rather tenuous, consisting of examples such as 'He says *yeah* instead of *yes*' and 'He just goes "Uhhh" until someone else says it'. Because there are few examples for /ɛ/ and /ɜ/, I added two extra sentences for intrusive-*r* following /ə/. I included six sentences which attempt to elicit reduced-vowel versions of utterances such as 'should have' as /ʃʊdə/ and 'going to' as /gɒnə/, by using spellings such as ⟨shoulda⟩ and ⟨gonna⟩. Again, this is not ideal: there is a tension between the relatively careful speech style associated with reading and the casual speech styles in which reduced forms such as 'gonna' would naturally occur. Indeed, some of my participants pronounced non-reduced forms of these utterances, so the written form ⟨gonna⟩ was sometimes converted to /gɒɪŋ tu/ by participants. Nevertheless, within the constraints of a reading task, the use of these re-spellings was the best way of trying to elicit reduced phonological forms. I also included nine filler sentences which did not necessarily contain contexts for potential linking or intrusive-*r* but which did contain words where rhotic speakers would realise a coda /ɹ/, to provide evidence for speakers' rhoticity or non-rhoticity. These were:

- The first four planets in the solar system are Mercury, Venus, Earth and Mars.
- Use a garden fork to break up the soil.
- In England people sometimes call William Shakespeare 'the bard' but in Scotland they use that word to describe Robert Burns.
- Bolton is the largest town in England.
- It's always a good idea to take an Ordnance Survey map if you go hill walking.
- Don't leave the window open, there's a wasp just outside.
- You can't beat Cumberland sausages made from free-range pork.
- You need butter and lard if you're making short crust pastry.
- If you don't have any butter then margarine will do.

Figure 4.1
The plan for the revised Sentence List Reading Task.

The sentence list was constructed from the table in Figure 4.1 by methodically selecting sentences that differ in two aspects from the previous sentence in the list: the colour coding in Figure 4.1 shows how this was done, by selecting the first sentence in each of the blue cells, then the first sentence in each of the pink cells, and so on. The filler sentences, the 'reduced vowel' sentences and the 'spare' sentences were also included, and the following list shows the basic pattern.

1. Word boundary linking-*r* after ə
2. Word boundary intrusive-*r* after ɔ
3. Morpheme boundary linking-*r* after ɑ
4. Filler sentence
5. Morpheme boundary intrusive-*r* after ɛ
6. Word boundary linking-*r* after ɔ
7. Word boundary intrusive-*r* after ɑ
8. Morpheme boundary linking-*r* after ɛ
9. Filler sentence
10. Morpheme boundary intrusive-*r* after ɜ

This pattern was continued until all 69 sentences were used. The point here was to avoid having, say, three sentences in a row with identical phonological contexts for linking or intrusive-*r*, which would have made it very apparent that there was a repeating pattern in the list. Although there is repetition of phonological contexts in my list in order for me to get three examples of each context, the constantly changing context from one sentence to the next makes this recurrence less apparent. The final list is given in Figure 4.2.

4.2 The elicitation task

Although the sentences task was designed to generate a reasonable number of sites of potential *r*-sandhi, I decided to create a further elicitation task to generate an even larger number of sites of potential R-sandhi. Furthermore, while this task too would involve the use of orthographic prompts, I wanted to minimise the amount of reading required of participants. In order to achieve this objective, I showed participants in this task place names and various suffixes on a computer screen, and the participants had to combine the place name and suffix to make a word. For example *Gretna* and *ish* were shown on the screen, and the participants had to form the adjective *Gretnaish*. The base and suffix were separate on the screen in order to reduce the possibility of

Sentences Task 1

1. The radio tuner always goes on the bottom shelf.
2. Dogs like to gnaw on bones.
3. The gate was barring our way so we climbed over it.
4. The first four planets in the solar system are Mercury, Venus, Earth and Mars.
5. I say yes, she says yeah. We're always yessing and yeah-ing at each other.
6. The birds soar up in the sky but you can still hear them singing.
7. When we went on holiday there was a spa in the village.
8. She thinks there's too much swearing on TV.
9. Use a garden fork to break up the soil.
10. She kept making these long drawn out "ummmm" and "uhhhh" noises. It was so annoying that I said, "Stop umm-ing and uhhh-ing and get on with it!"
11. Look at that car over there: it's bright yellow.
12. He uses a lot of slang. He says yeah instead of yes.
13. I got a referral to see a specialist next week.
14. In England people sometimes call William Shakespeare "the bard" but in Scotland they use that word to describe Robert Burns.
15. When I have to write a letter, I'm no good at punctuation. All that fullstopping and comma-ing gives me a headache.
16. I stare every time I see a Rolls Royce go by, in case someone famous is in it.

Sentences Task 2

17. When he can't think of the answer he just goes "Uhhh" until someone else says it.
18. There's some fancy lettering on it, so it might be valuable.
19. Bolton is the largest town in England.
20. I'm going to make a withdrawal from the bank.
21. The cat left fur everywhere.
22. There's a difference between a comma and a full stop.
23. The price of petrol keeps soaring up higher and higher these days.
24. It's always a good idea to take an Ordnance Survey map if you go hill walking.
25. When we went to the Lake District it was so peaceful; the only sound was the sheep baa-ing.
26. A metal ruler always comes in handy when you're doing DIY.
27. Guess what? I saw an elephant in town today.
28. It's a starry night tonight so there'll be frost.
29. He shoulda eaten something before he set off.
30. I adore all dogs, especially collies.
31. We're flying to Panama on Tuesday from Manchester Airport.
32. They were just staring at it in disbelief.
33. I think Emma'll be here soon.
34. He had a big scar on his cheek.

Sentences Task 3

35. There's a lotta apples and oranges on sale today.
36. I was stirring the mixture just like the recipe told me to.
37. The ice-cream has a kind of vanilla-y taste.
38. That pesky bear always steals picnic baskets.
39. Don't leave the window open, there's a wasp just outside.
40. That bird has very feathery wings.
41. You need to teach your cat that climbing and clawing are only allowed on her scratching post, not on your furniture.
42. Everyone makes mistakes: to err is human.
43. How do Angela and Becky cope with the stress?
44. She thought the kitten was adorable.
45. You can't beat Cumberland sausages made from free-range pork.
46. We were um-ing and ah-ing for ages.
47. I sent a letter and a postcard when I was on holiday.
48. The field is covered in straw and hay.
49. The workmen are tarring the road today, so there'll be delays.
50. I said I was gonna and I did, so there!
51. It's got a more intense flavour if you like spicy food.
52. My grandma always likes a cup of tea.
53. That apple crumble tastes a bit pearish.
54. You hafta investigate the situation before you start accusing people.

Sentences Task 4

55. If you need to go to a shop there's a Spar in the village.
56. Do ya always talk so loudly?
57. That's an incredibly furry cat.
58. That vase is quite China-esque, but I don't think it's an antique.
59. They swear all the time while they're at work.
60. You need butter and lard if you're making short crust pastry.
61. The tuna always sells out quickly.
62. I suppose it was quite a humorous story, but I didn't find it very funny.
63. I was sawing up some logs in the back garden.
64. You need to stir everything together thoroughly.
65. I'm going to India and China next year.
66. This cake is really moreish—I can't stop eating it!
67. That jacket is Eddie Stobart-ish but the other one is definitely Eddie Shah-ish.
68. If you don't have any butter then margarine will do.
69. Did you see Big Brother? Rula always complains about the tasks.

Figure 4.2
The revised Sentence List Reading Task.

the orthographic sequence ⟨ai⟩ triggering /e/ or another vowel, and also to emphasise that the task involved an active process of word-formation rather than reading a pre-formed word. In the case of *Gretna + ish* there is the potential for *r*-intrusion. In the task a mixture of bases and suffixes was used so that some combinations had the potential for linking-*r*, some intrusive-*r*, and others would have resyllabification of another consonant (such as *Preston + ish* to give *Prestonish*).

4.2.1 The pilot study version

The place names used as bases in the pilot study are given in (4:1).

(4:1)

Linking-*r*	**Intrusive-*r***	**Other**
Lancaster	Gretna	Bolton
Manchester	Cumbria	Preston
Chester	Middlesbrough	Blackburn
Southshore	Bermuda	Burnley
	Tundra	Blackpool
	Grimshaw	Darwen
		Garstang

The suffixes are listed in (4:2).

(4:2) ish, ic, ian, er, ette, ise

These bases and suffixes were chosen to give a range of phonological contexts for the (potential) *r*-sandhi. The 'linking-*r*' bases all end in /ə(ɹ)/ or /ɔ(ə)(ɹ)/ (see Wells (1982: 364-365) for discussion of variation between /ɔ∼ɔə/ in FORCE words). The 'intrusive-*r*' bases also end in either /ə/ or /ɔ/. The 'other' bases end in /n l ŋ i∼ɪ/.[1] Giegerich argues that RP *r*-sandhi is exactly paralleled by '*j*-sandhi' (1999: 195), and this labelling of the behaviour of /j/ as a 'sandhi' phenomenon is interesting. As discussed in Chapter 2, some accounts, such as Broadbent (1999), explain *r*-sandhi in terms of spreading of features that are already present in the vowel preceding the sandhi environment. Others account for it as the insertion of a new segment: both of these differing explanations could apply to the behaviour of /j/ and (/w/) as well as /ɹ/.

1. In the case of examples such as *Burnley* it would be interesting to see what happens in terms of glide-formation when vowel-initial suffixes are added. If the speakers *happy*-tense, then you would expect [j] to be formed, as it can be argued that [i] and [j] are the same underlying segment but that they occur in different syllable positions. However, if the speakers do not *happy*-tense, then it would be interesting to see whether [j] still surfaces: [j] and [ɪ] are not as phonetically similar as [j] and [i] are, even if [ɪ] and [j] are still argued to have the same melody.

One notable omission from the pilot study task were bases ending in /ɑ/ or /ɑr/, such as *Spa* and *Spar*.

A further potential problem with the pilot study task was the presence of /r/ in some of the bases. Even though in an example such as *Gretna*, the /r/ is in the onset of the syllable before the syllable involved in potential sandhi, there is acoustic evidence of the operation of long domain effects (see Hay & Drager (2007: 12–13), Hall (2007: 1) and Heid & Hawkins (2000) for a discussion of these effects). The presence of /r/, even at quite some distance from the hiatus position where sandhi could occur, could affect the production of a hiatus filling segment.

4.2.2 The improved elicitation task

During the pilot study I realised that presenting the suffixed forms as a single word can create confusion. In an example such as *Gretnaish*, the occurrence of the the spelling ⟨ai⟩ may seem to indicate /e/, so that the word might be realised as [ˈgɹɛʔˌneɪʃ]. I considered using a hyphen to spell the word ⟨Gretna-ish⟩, as I did for some of the items in the reading list, but it seemed possible that this punctuation could make participants pause, and thereby avoid creating a sandhi environment by effectively giving isolated citation forms of both the base and the suffix. Although there was no option in the reading list other than to use a hyphen for such problematic cases, in this elicitation task I decided to present all the bases and suffixes as separate units and explain that the point of the task was to combine them in order to make a longer word. I used Apple Keynote slideshow presentation software to create a slideshow which displayed each combination of base and suffix in turn. Figure 4.3 gives several examples of the stimuli in the elicitation task (the numbers refer to where they occur in the Keynote presentation). Because in examples such as *Lancaster* + *ish* it is easy to see that the two can be combined to give a word meaning 'reminiscent of Lancaster' or similar, I hoped that by analogy, my participants would attempt to combine examples such as *Locka* + *y* to give an adjective based on the place name *Locka*. In practice, although this approach worked in the majority of cases, it was not always successful: despite the separate presentation of the base and affix, pronunciations such as [lɒkeɪ] were sometimes given. This issue will be discussed below in Section 5.6.3 where I compare the results of two approaches: 1) assuming that these are non-occurrences of intrusive-*r*, and 2) assuming that these are not sites of potential intrusive-*r*, and therefore removing them from the count altogether. The fact that some speakers reacted differently to prompts such as *Locka* + *y*

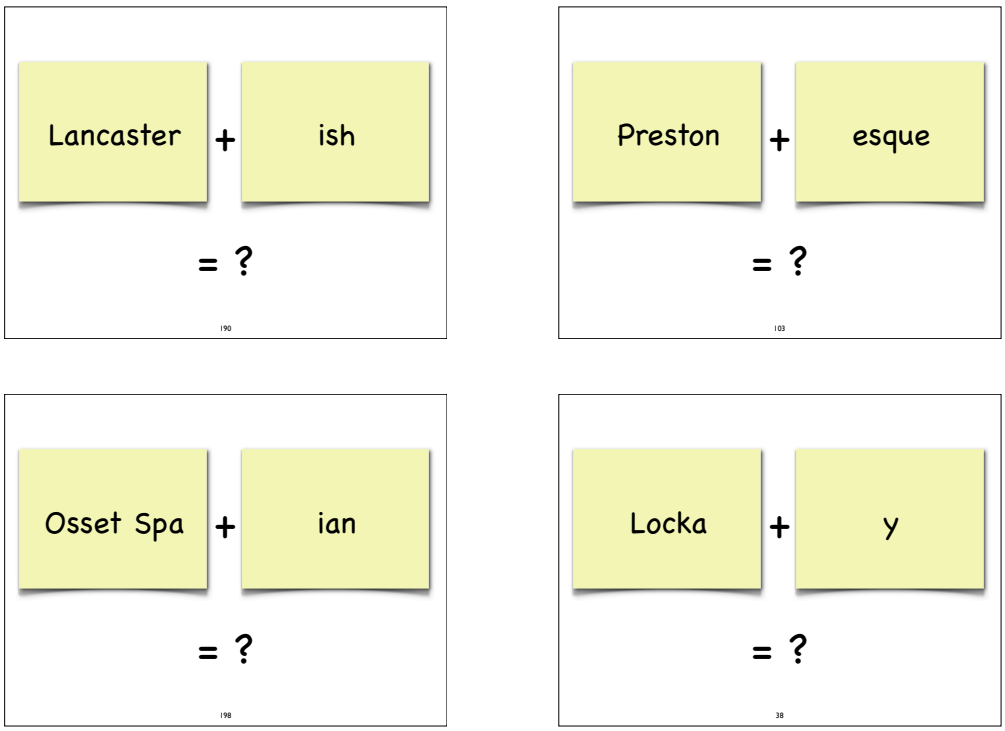


Figure 4.3
Examples of slides from the Keynote presentation showing combinations of bases and suffixes.

is interesting in itself, and shows that even where parts of fieldwork go 'wrong', or at least not as expected, they can still produce useful results.

As mentioned above, I attempted to improve on my pilot study task by avoiding examples such as *Gretna* where there is already an /r/ present in the base. In practice, this is rather difficult, as place names ending in schwa occur very infrequently. With reference to reference books on Lancashire place names such as Wylde & Hirst (1911) and Ekwall (1922), I was eventually able to construct a controlled set of place names to use as bases. These are given in (4:3), where 'Final Vowel' refers to non-rhotic speakers.

(4:3)

Final Vowel	**Linking-*r***	**Intrusive-*r***
ə	Lancaster	Locka
	Manchester	Gilda
	Birchover	Noyna
	Calder	Banna
ɔ	Shore	Audenshaw
	Helmshore	Nutshaw
	North Shore	Openshaw
	South Shore	Dunnockshaw
ɑ	Hall Carr	Osset Spa
	Aldercar	(Sca Fell) Sca
	Broad Carr	Boston Spa
	Walney Scar	Stanah

A set of five other place names which do not end in a context for linking or intrusive-*r* was added to the set of base forms, and is given in (4:4).

(4:4) Preston, Darwen, Bolton, Garstang, Burnley

Two place names with final /ə/ but which contain an /r/ earlier in the word were also included, to see whether they were more or less likely than examples without /r/ such as *Locka* to lead to realisations of intrusive-*r*. These are given in (4:5).

(4:5) Gretna, Middlesbrough

Having established a set of bases, I selected suffixes according to their initial vowel. Mindful of the fact that different suffixes are often claimed to operate at different stages in phonological derivations (see e.g. Monahan 1995: 47), or at least that different suffixes can have different effects on the stress of the base to which they attach, I formed the following set of suffixes, given in (4:6).

(4:6)

Initial Vowel	**Suffix**	**Stratum/Level**
ɪ	-IC	1
ɪ	-ISH	2
ɪə/iə	-IAN	1
ɪ/i	-Y	2
ə	-ER	1 or 1∼2
ɛ	-ESQUE	1∼2
aɪ	-ISE	1∼2

I included every combination of base and suffix in the slideshow, so that there were 217 forms collected (7 × 31). In addition, I began the task by collecting citation forms of each of the place names in turn, giving an additional 31 utterances. This introductory exercise served two purposes. First, it allowed the participants to become familiar with the place names and to say them out loud without having to 'do things to them' by adding suffixes to create new words. Second, the resulting utterances allowed me to investigate whether any speakers produced hyperrhotic pronunciations of some vowel-final words, such as *Gilda* [gɪldəɪ], even in utterance final position. If a speaker did produce such realisations it would raise the possibility that tokens of apparently intrusive-*r* produced in the rest of the task might be the result of a categorical use of coda /ɪ/ with these vowels, rather than being the result of a context-conditioned sandhi process.

As in the reading sentence task, I avoided giving my participants a series of identical contexts in succession, such as would result from giving them one place name and asking them to add each suffix in turn. Instead, as in the reading task, I systematically selected bases which differed in two ways from the previous base: the intrusive or linking context and the vowel before that context. In addition, I selected the next suffix in turn from the list in (4:6). The list in (4:7) demonstrates the pattern.

(4:7)

1. ə + linking-*r* context + -IC
2. ɑ + intrusive-*r* context + -ISH
3. ɔ + linking-*r* context + -IAN
4. ə + intrusive-*r* context + -Y
5. ɑ + linking-*r* context + -ER
6. ɔ + intrusive-*r* context + -ESQUE
7. non *r*-sandhi context + -ISE

By adding the additional place names in (4:5) to the list I was able to maintain the cycle of combinations shown in the above list until all 31 place names had been combined with all 7 suffixes.

This exercise was designed to give an indication of what strategies speakers would use when asked to produce novel forms, as opposed to reasonably well-known shibboleths such as *law and order/Laura Norder*. Although the vast majority of the elicited forms are novel – the verb *Dunnockshawise* is highly unlikely to have occurred outwith this elicitation task – the basic concept was not too outlandish for participants to deal with. After all, forms such as *Boltonian* or even *Manchesterish* might very well be used in naturally occurring speech, and so it did not require too much of a mental leap to try adding those suffixes onto other place names. I could have used neologised nonsense words as the bases, but I felt that it was preferable to use potential real-world examples, however infrequently they might occur in everyday speech (several of the place names are of very small settlements). The selection of these real place names took some time, but, having selected them, I was able to produce a map of their locations, which proved a useful introduction to the task when I was explaining it to my participants. The two versions of the map I showed to my participants are shown in Figures 4.4 and 4.5. The maps show a focus on the north of England and the North West in particular. Given some of the topics which had by this point in the interview already been discussed in the conversation section, this use of maps with the clear distribution of the place names involved in the task seemed to legitimise the slightly odd task I was asking my participants to carry out. Although the nature of the task was unusual, it was in some sense still connected with the geography of the North West of England, which was already salient.

4.3 The conversation section of the interview

In addition to the reading and elicitation tasks, I aimed to record a reasonable length of spontaneous conversational speech from each participant. In practice, I usually managed to record over an hour in each interview, and adopted several strategies in order to encourage my participants to speak in a reasonably informal conversational speech style. The first method I adopted was based on Labov's ideas of conversational modules which form networks of topics (Labov 1984: 34–5), as discussed by Milroy & Gordon (2003: 59). The idea here is that by planning ahead the fieldworker can select relevant topics of conversation during a particular interview, and thereby keep the conversation flowing. Figure 4.6 shows my adaptation of this

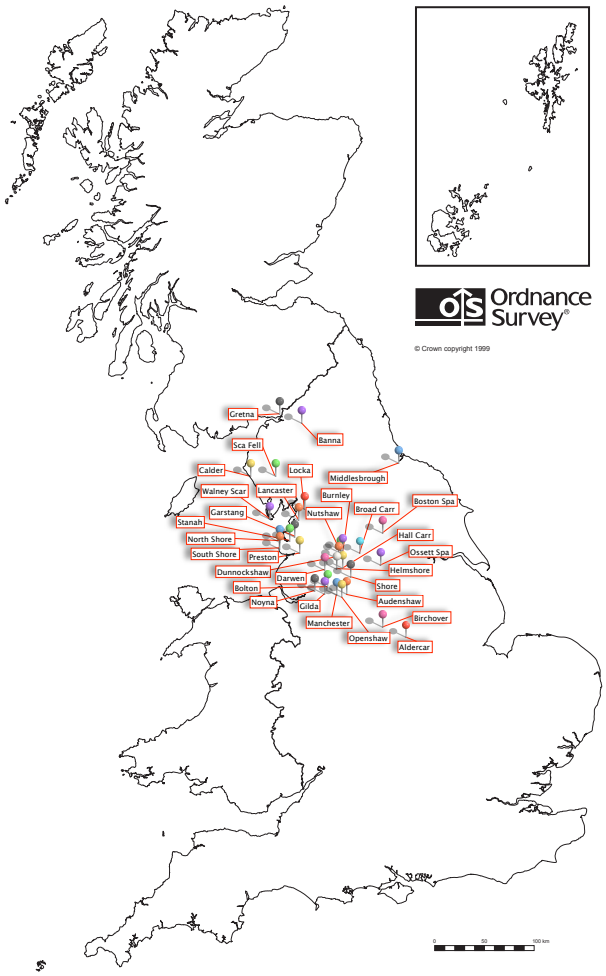


Figure 4.4
Suffixation task map, small scale.

system. In some early interviews I discovered that this network of conversation modules could become an apparent hindrance to natural conversation. Some of my informants would see the copy of these questions as I unpacked my recording equipment, and, in an effort to be helpful and co-operative interviewees, attempt to give answers to each module in turn. The results were often rather brief, and not really the sort of free-flowing spontaneous conversation I was aiming to collect. Where this happened, I then had to allow the conversation to turn naturally to other topics of interest to the participant. This usually produced much more lengthy and animated conversation. Indeed, once these participants thought that I had the 'answers' I was looking for, they tended to relax and talk much more freely. In the light of this, as I gained more experience of carrying out this fieldwork, I tended to allow the conversation to begin wherever

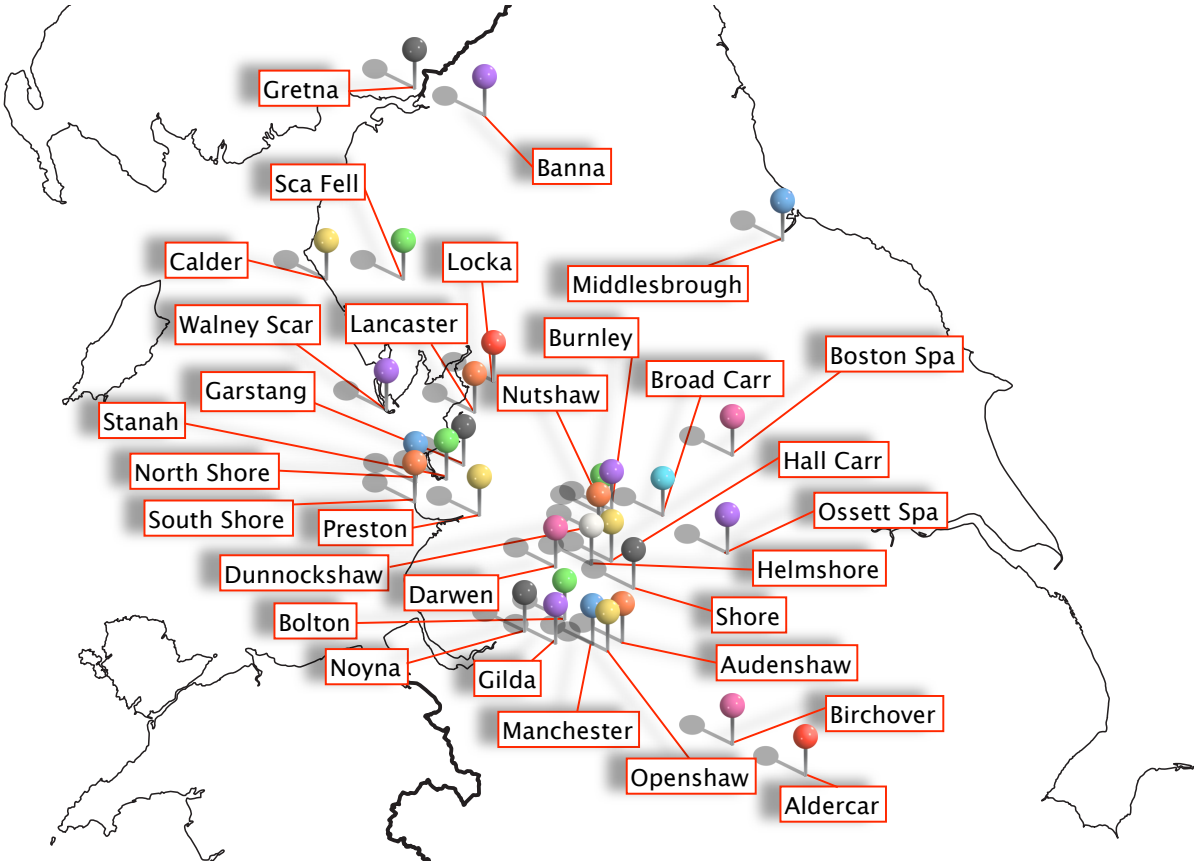


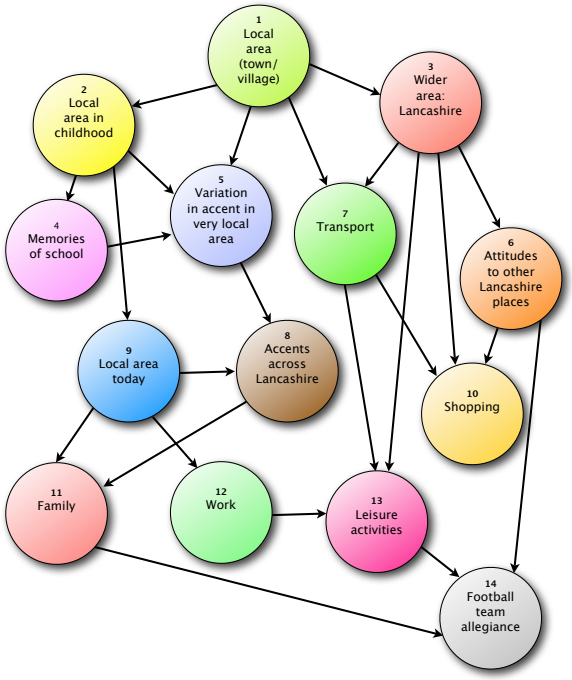
Figure 4.5
Suffixation task map, large scale.

the participant wished: I found that after I had described and explained the recording equipment and the clip-on microphones, and had been offered a cup of tea (almost without exception, my interviews began with, and were punctuated by, tea and biscuits), my informants were already fairly well at ease and willing to just begin talking.

In common with a fairly standard procedure in sociolinguistic interviews, I carried out the conversational section of the interview first. I would usually allow up to 90 minutes for this stage of the interview: the limit was not the length of time for which my participants were willing to talk, but rather the fact that I had to allow time for my elicitation tasks to be completed.

4.4 Participant selection

This project combines traditional dialectology, elements of sociolinguistics, and the use of data from structured elicitation tasks in an exploration of phonological theory. These various features of the research mean that the participants need to be selected in such a way that the data they provide will allow all the aims of the research to be reached. The first stage was to define



Conversation Topic Planner

Topics can be covered in any order, and it is not essential to cover all topics. This is to be used as a guide for topics of conversation.

1. Local area (town/village)
- What is it like living here?
- What are the good points?
- Are there any bad parts about living here?
- If your neighbours had just moved here, what do you think would be the most interesting and important things they should know about the area?

2. Local area in childhood
- What was it like when you were growing up?
- What sorts of things did you do when you were a child?
- Can you remember any times when you got up to mischief and got told off?
- Do you think children today have changed from when you were young?

3. Wider area: Lancashire
- Do you think that you "belong to Lancashire"?
- Do you like living in Lancashire?
- Do you think places like Manchester are still in Lancashire?
- Do you think there is any rivalry between Lancashire and other parts of the north, such as Yorkshire?
- Do you see yourself as "northern"? If so, whereabouts do you think the north/ south divide is?

4. Memories of school
- Did you enjoy school?
- What subjects did you enjoy?
- Were there any teachers you particularly liked or didn't like?
- Do you have any particular memories or interesting stories about school?
- Do you think modern school children behave differently from the way you behaved when you were at school?

5. Variation in accent in very local area
- Are there any very local differences in accent – things that an outsider might not even notice?
- Do you think there were local accent differences when your parents or grandparents were young?
- Can you remember any local dialect words that older people used?
- Do you think this is changing?

6. Attitudes to other Lancashire places
- What do you think about other parts of Lancashire or the North West?
- Are there places you particularly like or don't like?

7. Transport
- Are there good bus or train services?
- Do you drive?
- What is traffic like?
- Is the cost of petrol affecting your day-to-day travel?
- What do you think about the proposed Manchester congestion charge?

8. Accents across Lancashire
- Do you notice anything about the ways people talk in different places in Lancashire?
- Do people use different words for things?
- Do people pronounce words in different ways?

9. Local area today
- What is it like to live here today?
- Has it changed from when you were younger?

10.Shopping
- What shops do you have locally?
- Do you do a big weekly shop?
- If so, do you travel to another town to go shopping?
- Do you ever travel to larger towns or cities to go to particular shops apart from food-shopping?

11.Family
- Do other members of your family live locally?
- Have any of your friends or family moved away?
- If so, do you think this has changed them?
- Has it changed the way they talk?

12.Work
- Where do/did you work?
- What are the good and bad points about your job?

13.Leisure Activities
- What do you do in your spare time?
- Do you regularly travel to different places to take part in activities?

14.Football team allegiance
- Do you support a football team?
- Does everyone in your family support the same team?
- Are there particularly strong rivalries between teams?

Figure 4.6
Network of modules for the conversation section of the interview.

the sample of participants; the second more practical issue was how to gain access to these participants.

4.4.1 Defining the sample population

The dialectological aspect of the research meant that people from several different places were required: a key variable is PLACE. Given that the research questions are based on the idea that there may be a change in progress in East Lancashire – a loss of rhoticity – then an apparent time technique (Labov 1994: 45–6) of interviewing different age groups of speakers is also appropriate: AGE is a second variable. While traditional dialect surveys such as the *SED* often involve only one or two interviewees in any particular place, quantitative variationist sociolinguistic surveys tend to involve data from several interviewees for every 'cell' of the sample. This system has the advantage of allowing mean values to be obtained for the use of particular variants of variables, and provides a defence against the type of criticisms sometimes levelled at traditional dialect surveys: that they are not representative of the communities living in particular places but are only a snapshot of one individual from each place. However, as Chambers & Trudgill (1998: 30) point out, in the case of surveys such as the *SED* this focus on older speakers of the vernacular was precisely the intention. Kretschmar also discusses the different aims of dialectology and sociolinguistics: 'dialectology and sociolinguistics can be scientific, just in different ways' (1996: 277). Chambers & Trudgill (1998: 30) note that some younger speakers feel 'disturbed' that the features recorded in dialect surveys are 'totally alien' to them, and suggest that future dialectological surveys will 'have to be directed towards more representative populations' (1998: 30).

A survey which uses several interviewees per sample cell should be able to reduce the effect of idiolectal variation which could skew an analysis of geographical place as a variable. However, practically speaking, increasing the number of speakers per cell of the sample has the effect of exponentially increasing the number of interviews required. In addition, while it may be useful to average across the speakers from one particular place when quantifying the variation in a variable such as rhoticity in order to perform some kind of analysis of the geographical extent of that feature, it may also be very important to be able to examine the data from individual speakers. Britain (2001) discusses variation in the BATH vowel in the Fens and writes that the members of an single family 'appear to follow their own individual paths along the change from

Figure 4.7
East Lancashire locations.

[a] to [aː]' (2001: 238). In such a situation, dealing only with mean values would mask the some of the finer level of variation contained in the survey data.

So far I have introduced two variables, PLACE and AGE. I now discuss each of these in relation to the sample.

4.4.1.1 Variable 1: Place

The fieldwork was carried out in Accrington, Rossendale, Ramsbottom, Bury and Prestwich. In addition to covering a potential transition zone between rhotic and non-rhotic dialects, this set of places also allowed investigation of the effect of a large city on its outlying areas. The gravity model, as discussed by Trudgill (1974: 233), would suggest that places further along the line from Manchester to Accrington should be less influenced by Manchester in many aspects of social behaviour (including commuting and work patterns, leisure activities and social identity) and in the phonological systems of their inhabitants.

Fortunately, the line between Manchester and Accrington is not arbitrary, but follows the Irwell Valley through Bury and Ramsbottom to Rossendale. One of the earliest Industrial Revolution era roadbuilders, John Metcalfe, known as Blind Jack of Knaresborough, built a road between Bury and Accrington between 1789 and 1792 (Anon 1795: 150). It has thus been

reasonably easy to travel along this route for at least the last 200 years. The valley is now the route of the A56 trunk road, which goes all the way to Accrington, and this route is shared by the M66 motorway as far as Edenfield, just north of Ramsbottom. The towns along this valley, Bury, Ramsbottom and Haslingden, are situated along the route at intervals of four to five miles. Figure 4.7 shows these locations, superimposed on a map from Orton et al. (1978) showing traditional rhoticity in the word *third*, and with the Greater Manchester region indicated (cf. Figure 3.4 on page 67 for a map of the same localities showing the location of major roads and built-up areas).

4.4.1.2 Variable 2: Age

There is an argument that, in apparent time studies, at least three age groups are required in order to be able to plot points on a graph in order to see whether there is a linear correlation between apparent time and another variable. However, even this method requires an assumption to be made that any correlation with age would be linear, and increasing the number of age groups again has an exponential effect on the number of interviews that need to be recorded. There are studies which compare two age groups. Milroy & Gordon (2003: 39) mention Gordon's work in Michigan, which involved a 'binary division of his Michigan subjects, which contrasted adolescents and middle-aged adults'. I adopted this method in my survey, interviewing retired speakers aged over 60 and younger speakers in their 20s.

4.4.1.3 The sample population

Table 4.1 shows the sample population for this survey. Place and age are the two variables considered, with other variables, such as speaker sex, to be controlled for. Specifically, I included only female speakers in the survey. This approach is a departure from that taken in some traditional dialect surveys, in which male participants are used because, 'in this country men speak vernacular more frequently, more consistently, and more genuinely than women' (Orton 1962: 15). In the case of East Lancashire there are at least two pertinent issues here. First, as discussed in Chapter 3, there was a large female workforce in the cotton industry, and these women had a very local socio-cultural focus. The resulting social networks in which these women lived are dense and multiplex (Milroy 1987: 20–1). As these aspects of social network structure are typically 'associated with low-status groups, men and adolescents' (Milroy 1987: 208), the same arguments used to justify the use of male participants in traditional dialect surveys can be used to justify the use of female East Lancashire participants in my survey.

Locality	Younger Age Group	Older Age Group
Accrington	Three speakers	Three speakers
Haslingden	Three speakers	Three speakers
Ramsbottom	Three speakers	Three speakers
Bury	Three speakers	Three speakers
Prestwich	Three speakers	Three speakers

Table 4.1
East Lancashire Sample Population

Second, if women do stereotypically tend to be more speech conscious (Chambers & Trudgill 1998: 30), and more open to influence from speakers of other varieties, then it is logical to use female participants in a survey examining the potential for a traditional dialect feature to undergo attrition and an incoming dialect feature to spread.

There are three speakers per cell, to give a total of 30 speakers in the survey. My sample was not socially stratified in terms of different socio-economic classes. I did control for 'localness': my requirement was for volunteers who had been 'born and bred' (a phrase which my participants often used in their own self-identification as suitable volunteers) in the town or village where they now lived. In practice, this did produce considerable homogeneity in the sample in terms of class, with the caveat that the changing nature of the educational opportunities available to my younger age group of speaker means that many of them have higher levels of educational attainment than my older speakers. My older informants fell into two categories: most of them left school at age 14 and went to work in manual jobs in mills or factories; a minority stayed on at school until 17 or 18 to take their school certificate. This second group took office jobs, often in the same factories as the manual workers in my survey (remember that the local economy in many East Lancashire towns was often dominated by one or two large factories or cotton mills). Several of my younger speakers had been either to local further education colleges or to nearby universities (Salford, Manchester, and in one case Liverpool). However, again, the 'localness' selection criterion was important here: Pre28, who had studied in Liverpool, resolutely self-identified as 'local' to Prestwich, with no desire to move away in the future.

4.4.2 Gaining access to participants

Various strategies were used for finding suitable participants. These included posting messages on local community websites, visiting local groups such as local history societies and, most successfully, contacting friends of my first participants until I had sufficient participants for each

cell of my sample. As a general rule, people are willing to help with dialect research: although I did not go into specific detail about my focus on rhoticity and *r*-sandhi, the fact that I was documenting some aspects of Lancashire dialect was enough to persuade almost everyone I approached about taking part in fieldwork that it was worthwhile. However, it is sometimes difficult to follow up on initial contacts: some potential participants eventually declined to take part, and this meant that the process of fieldwork was quite a prolonged business. In addition, the fact that my sample was to be controlled so that I required only female speakers was also a factor. As I made contacts, I did have several male volunteers, and several married couples who took part together. Although in one sense recording male speakers was outside the scope of my sample population, it does mean that I have accumulated further recorded evidence which could be useful in future, and indeed, some contacts with suitable female volunteers were made because I had already interviewed some male speakers who knew them, so while this too added to the length of time involved in data collection, it was worthwhile.

4.5 Use of recording equipment

The practicalities of recording my interviews turned out to be problematic, although eventually an excellent system was devised with the help of Barry Campbell, the Sound Technician in the Department of Linguistics and English Language at the University of Edinburgh. The final system consisted of two AKG C587 lavalier microphones, each powered and pre-amplified by a Sound Devices MP-1 preamplifier, channelled into a Marantz PMD 660 digital recorder which captured linear PCM audio at 16-bit resolution with a sampling frequency of 48kHz. This system allows for two-channel recording where participants are interviewed in pairs, with excellent separation because each participant is 'close-miked' individually. The MP-1 preamplifiers produce a very clean signal, and each one has a built-in limiter which prevents any abnormally loud signals (coughs, laughter, particularly loud speech) from overloading the recorder and distorting. The system could be set to record single channel monophonic sound very easily, for interviews with a single participant and for the reading and elicitation tasks. The whole system could be battery powered, which allowed it to be set up in a convenient location in the participant's home. All of the above system components are optimal for successful recordings, but this system was arrived at by trial and error.

4.5.1 Problems with recordings and solutions used

In my pilot study I tried out various options for organising and recording the interviews. An early approach I used was to record a family of four in a fairly informal setting using an M-Audio Microtrack digital recorder and a Sony ECM stereo tabletop microphone. There were clear benefits in the conversation section of the interview arising from the informal setting and the unobtrusive recording equipment, which was placed on a coffee table in the middle of the room. A great deal of lively conversation was captured, and it seemed to me that it approached the kind of casual speech typically aimed at in Labovian sociolinguistic interviews, as described in Milroy & Gordon (2003: 49).

However, there were obvious issues with the clarity of the recording. Although there was a degree of stereo separation on the recording, there were four speakers and a single stereo microphone, so any overlapping speech was difficult to transcribe accurately. While the use of a desktop microphone was unobtrusive, it did mean that participants who were further away from the microphone were picked up less clearly than those who were nearer to the microphone. In addition, all participants, even those closest to the microphone, sounded somewhat distant because of the microphone placement.

In order to obtain a clearer recording for each speaker, I decided to use clip-on lavalier microphones. Because the recorders available to me had only two tracks, this effectively limited me to a maximum of two participants in an interview (although portable four-track recorders do exist which can record four discrete channels of audio simultaneously). However, restricting the interview to a maximum of two speakers was sensible in order to ensure that each participant produced enough speech for analysis, so this was not in fact a limitation. The AKG C587 microphones are high quality condenser microphones, which means they produce a clean signal. In addition, because they clip on to a participant's clothing, they pick up that participant's speech very strongly, with background noise or the interviewer's speech being much reduced in volume. Moreover, a high degree of separation between the two recorded channels is achievable, which means that any overlapping speech is significantly easier to deal with than it is with a single-point stereo microphone.

These microphones require a phantom power supply from either a dedicated preamplifier or from the inputs of a recorder. The Marantz PMD 660 has two XLR microphone sockets with 48V phantom power so the two microphones could be connected directly to the recorder. Several

of my recordings were made using this set-up, and were fairly successful. The procedure at the start of the interview was to chat to the participants while setting the recorder's recording level and listen to a short test recording before continuing with the interview. Periodically during the interview I would check that the level meters on the recorder still showed an acceptable recording level with no overloading of the recorder. However, after several recordings had been carried out, it emerged that there was a problem with the compatibility of the microphones and the preamplifiers and phantom power supply on the Marantz PMD 660. Although the recorder itself was not overloading, the microphones themselves were operating below their capabilities, and producing some distortion. In a digital recorder, it is impossible to record a signal that rises above 0dB using zero as a full scale reference. When presented with such a signal, the analogue-digital convertors in the recorder can only digitally clip the signal, which produces a very harshly distorted sound. Such a recording is very difficult to listen to, let alone carry out any form of acoustic analysis on. However, the problem with the combination of the AKG microphones and the Marantz recorder was that the microphones themselves were overloading at a much lower sound pressure level than their specification states. This meant that even fairly modest increases in the volume of a participant's speech could cause a distorted signal: this problem was not caused by digital clipping in the recorder, but analogue distortion at the source. Consequently, there was no visual clue on the recorder's level meters that any overloading was taking place; the distortion became apparent only later, when the whole recording was listened to. While the reading and elicitation tasks were almost entirely unaffected by this distortion, parts of the conversation recordings were. During the conversations, participants tended to become engaged with the topics of discussion and the slightly increased volume of their speech could lead to a distorted signal.

On further investigation, I discovered that the quality of the Marantz PMD 660's phantom power supply has been questioned in some reviews of the unit, including one aimed specifically at linguists (Plichta 2007). Plichta's review of the Marantz PMD 660 is fairly damning: he writes that '[t]he unit has low-quality microphone preamplifiers and phantom power supply. Dynamic microphones, such as Sennheiser MD46 or Shure SM58, are not provided with enough gain. Condenser microphones requiring using on-board phantom power supply (e.g., Countryman B3) tend to be very noisy and to distort very easily'. It is well documented that microphones which depend on phantom power operate with reduced headroom if they are provided with a low

Locality	Older Age Group	Younger Age Group
Accrington	Acc1,Acc2,Acc3	Acc4,Acc5,Acc6
Haslingden	Ros7,Ros8,Ros9	Ros10,Ros11,Ros12
Ramsbottom	Ram13,Ram14,Ram15	Ram16,Ram17,Ram18
Bury	Bur19,Bur20,Bur21	Bur22,Bur23,Bur24
Prestwich	Pre25,Pre26,Pre27	Pre28,Pre29,Pre30

Table 4.2
East Lancashire Sample Population: Speaker Labels

voltage phantom power supply, which means that they overload at lower sound pressure levels than would normally be expected. Plichta's review and my own experience suggest that the PMD 660's phantom power supply is inadequate to power the AKG microphones I wished to use. Indeed, he writes that 'the microphone preamplifiers and phantom power supply do not produce reliable speech recordings for the purposes of acoustic analysis. If critical work is required, the unit should not be used' (Plichta 2007). However, there are many good features of the Marantz recorder, including its long battery life and portability. The solution to the problem was to use separate microphone preamplifiers to power the microphones and then input the signal from these to the recorder's line input, thereby bypassing the recorder's own preamplifiers. The Sound Devices MP-1 is a single channel portable microphone preamplifier, so a pair of these units is used for a two microphone recording. The MP-1 is also battery powered, so the portability and practical advantages of the recording system were still maintained. The overloading and distortion previously encountered was eliminated by using the MP-1 units and, in addition, each one contains a limiter, so that if any extraordinary loud signals are picked up by the microphone the signal will still not distort. This system turned out to be ideal for making my recordings.

4.6 Post-interview cataloguing of sound files

The sound files were transferred from the recorder to a computer and backup copies made as soon as possible after each interview. Due to the structure of the interview, each participant had at least one sound file of conversational speech, together with separate files for the various elicitation and reading tasks. Although I could have consolidated these into a single edited file for each speaker, I decided to leave the files unedited, and simply catalogue them in folders corresponding to the cells of my sample population. I used the coding indicated in Table 4.2 so that I could identify speakers with labels such as Acc1 and so on.

4.7 Use of ELAN application for transcription

Having catalogued my recordings in labelled folders, I had to deal with the issue of how to transcribe and code for variants of *r*-sandhi. Various software applications allow for time-aligned transcriptions to be made, so that orthographic or phonetic transcriptions can be linked to the original audio recordings. This is clearly desirable in many aspects of linguistic study involving recorded audio data, and especially so when the object of study involves aspects of the phonetic detail on the recordings.

I began by using a software application called Transcriber (Boudahmane et al. 2008), which allowed for basic orthographic transcription to be linked to relevant segments of the audio file. However, there are two key limitations with this piece of software in its current state (it is apparently in the process of being redeveloped). First, it cannot handle Unicode text encodings, which are necessary for phonetic transcription using the extended characters found in the International Phonetic Alphabet. Secondly, it is designed to be able to transcribe interviews with two people speaking, typically an interviewer A and an interviewee B, but any overlapping speech is treated as a third category, labelled 'A + B'. Although it is possible to introduce a third speaker, C, the issue of dealing with overlapping speech means that is is difficult to transcribe spontaneous conversation between three speakers, as is found in several of my recordings where I interviewed a pair of speakers.

The application ELAN (Max Planck Institute for Psycholinguistics 2008) does not have either of these limitations. It can display and work with text from the whole Unicode specification, so using phonetic symbols is straightforward. In addition, it uses a timeline-based approach to creating and editing the transcriptions, with the possibility to create one (or more) 'tiers' of transcription for each speaker, which can overlap as necessary.

4.7.1 Transcription scheme for rhoticity and r*-sandhi*

ELAN allows a hierarchy of transcription tiers to be used. I describe each of my transcription tiers below.

4.7.1.1 Orthographic tier

I transcribed the interviews orthographically. I did not transcribe my own speech: not only because my speech was not the object of study but also because I was not wearing a lapel microphone, so my speech was very distant on the recordings.

4.7.1.2 *Realisation of* r

The orthographic transcriptions allowed me to focus in on potential tokens of syllable coda /r/ and of *r*-sandhi. On the next tier, labelled 'Realisation_r', I noted each potential coda-*r*, linking-*r* and intrusive-*r*. I did not prejudge whether an individual speaker was rhotic or non-rhotic; a categorisation like this can be made once the data has been transcribed. I coded the articulation of each potential instance of *r* as either −, + or ++, where − represents no audible consonantal constriction, ++ represents a constricted consonantal *r* and a single + indicates an intermediate articulation in which there is some audible constriction but it is not as extreme as a clearly consonantal token of *r*. (Typically the Lancashire speakers realise /r/ as [ɹ], but I am not distinguishing this from other potential realisations such as [r], [ɾ] or [ʋ]).

This three-way distinction raises issues of the phonological status of each of these labels: − and ++ correspond to clear absence or presence of *r*, but the single + is harder to place. In terms of auditory phonetics though, this three-way distinction seems justified. The *SED* transcriptions mentioned above in Section 3.1.1 make use of both a segmental [ɹ] symbol and a superscript [ʳ] to indicate *r*-colouring on a preceding vowel, and sometimes a combination of both symbols as in *barn* [baʳːɹn] (I.1.11 La2). When it comes to quantifying the production of rhyme *r* or *r*-sandhi, this three way coding scheme allows for some flexibility: it is possible to consider only the clearly (non) rhotic tokens by including − and ++ and discounting the intermediate + tokens; it is possible to consider any constriction as counting as a rhotic by combining the + and ++ tokens and comparing this group to the − tokens; it is possible to treat all three groups separately as −, + and ++. This third approach may be useful if it seems that the intermediate + tokens are a manifestation of some feature of the phonological systems of the participants in the survey. For instance, if a particular speaker produced many instances of what seems to be intrusive-*r*, but they are all + tokens, and these *r*-coloured vowels also occur in non-etymological non-sandhi environments, then there would be good evidence that the speaker had a system of hyperdialectal-*r* rather than an intrusive *r*-sandhi process.

4.7.1.3 *Context of* r

A problem in establishing the contexts in which rhotics are produced is that to some extent the labels given to contexts make implications about the phonological systems of the speakers. If an *r* is realised in connected speech in a phrase such as *nea[r] and far* then it could be labelled as a 'linking *r*' context for non-rhotic speakers, but this label would seem inappropriate for

rhotic speakers, who would be expected to realise an *r* even if there were no sandhi context. My approach is to attempt a consistent scheme for all my speakers, regardless of whether they could be labelled 'rhotic' or 'non-rhotic'. This leads me to use the following set of labels:

1. **coda** for contexts such as *far̲m* or *far̲ {C, |}*, in which if a rhotic is realised it would conventionally be assumed to be in the coda of a syllable.
2. **linking** for contexts such as *far̲ away*, in which if a rhotic is realised it would count as a linking-*r* for speakers with *r*-sandhi in their phonologies.
3. **intrusive** for contexts such as *law̲r of*, in which if a rhotic is realised it would count as an intrusive-*r*.
4. **none** for contexts (specifically in the reading and elicitation tasks) which were intended to be potential sites of intrusive-*r*, but which the speakers altered to remove the sandhi context. For example, some speakers read *lotta apples* as *lot of apples*, thereby removing the context for intrusive *r*. The reason for labelling these separately is that it may be useful to include these particular utterances in the analysis if it seems that they are not merely accidental non-sandhi environments, but that some speakers use the removal of a sandhi-context as an active means of avoiding an awkward hiatus between vowels. In that case, this category can be combined with **intrusive** and would increase the number of − tokens in that category.

4.7.1.4 Morphological Context

The site of the rhotic is labelled as being either at a word boundary (**W**), a morpheme boundary (**M**) or as being in a non-boundary position (**NA**). The **NA** label does not apply to sandhi environments but is relevant for quantifying (non)-rhoticity in words such as *farm*.

4.7.1.5 Preceding segment

The preceding segment could be transcribed in IPA, because ELAN is designed to work with Unicode text format. So in the sandhi contexts the segments [ɑ, ɔ, ə, ɛ, ɜ] could be transcribed. For the potential coda-*r* tokens a few additional segments were considered: some of the rhotic speakers would realise e.g. *near* as [niɪ], as would be expected in other rhotic dialects. However, equally *r*-ful tokens were realised as [nɪəɪ], in which case [ɪə] was transcribed as the preceding segment (at this transcription stage I made no assumptions about the phonemic status of these preceding segments).

4.7.1.6 Following segment

Similarly, the following segment was transcribed in IPA notation: [i, e, ɛ, a, ɑ, ɔ, o, u, ə, ɜ, ɪ, ʊ, ɒ].

4.7.1.7 Stress

I made a four-way distinction:

1. **sS** – lexically stressed in phrasally stressed position
2. **uS** – lexically unstressed in phrasally stressed position
3. **sU** – lexically stressed in phrasally unstressed position
4. **uU** – lexically unstressed in phrasally unstressed position

As would be expected, uS tokens were rare: these were usually the result of unusual emphasis in a particular discourse context. Tokens coded sU were more frequent, as the nature of the connected speech in the conversation task (and in the sentences task) meant that some syllables that would be stressed in citation forms of the words were less prominent. This scheme was an attempt to record as much detail about stress/emphasis as was possible: in analysing the results it was possible to collapse the distinction to a binary stressed (S) / unstressed (U) distinction.

4.7.1.8 Notes

Any unusual features were noted on this tier, together with explanations of odd tokens, such as when a potentially linking token was realised with a long pause, thereby removing the sandhi context.

4.8 Coding, collation and presentation of data

All three sets of data include potential instances of rhoticity, linking-*r* and intrusive-*r*. In the case of the sentences and eliciation tasks these were controlled. In the sentences task, for instance, example (4:8) contains a potential instance of linking-*r*, example (4:9) contains a potential instance of intrusive-*r* and example (4:10) contains a potential instance of coda-*r* together with a further potential instance of intrusive-*r*.

(4:8) The radio tuner always goes on the bottom shelf.

(4:9) The tuna always sells out quickly.

(4:10) I was sawing up some logs in the back garden.

By coding each potential instance of coda-*r*, linking-*r* and intrusive-*r* for its degree of constriction, frequency counts can be generated for all three types of *r*.

4.8.1 Transcription Methodology

In order to be able to compare the data from the speakers in my sample, some of whom would typically be labelled non-rhotic while others would be labelled rhotic, I transcribed each potential instance of *r*. Clearly, while an idealised consistently non-rhotic speaker would realise 0% of the potential instances of coda-*r* in her speech, and an idealised rhotic speaker would realise 100% of the potential instances of coda-*r* in her speech, in approaching my real-world data it is important to count all the instances where a speaker does not produce a surface-*r* as well as each occasion when she does produce a surface-*r*. As a shorthand, I use 'token' to refer to the site of a potential instance of *r*. This approach follows that taken by Hay & Sudbury (2005) who transcribed '13,760 nonprevocalic /r/ tokens' according to a transcription scheme in which 'two variants were coded–[r] and ∅' (2005: 805). Likewise, Johnson (2009: 374) discusses an analysis of the vocalisation of post-vocalic /r/ in New York City English, using a dataset of 3000 tokens: each token of this variable (r) could be realised as a consonantal *r* or vocalised (the equivalent of Hay & Sudbury's ∅). This use of 'token' is simply a convenient term: although in my transcription scheme a 'token' of intrusive-*r* could be non-realised as –, this does not mean that I am assuming that intrusive-*r* is underlyingly present and has been deleted. Of course, many accounts of the phonology of non-rhotic varieties of English argue that the phonology of non-rhotic speakers could have undergone a restructuring so that, for example, there is no longer an underlying /r/ present for those speakers in a word-final context (see Section 2.3.2). This has clear implications for any form of comparative quantitative work. With a reading task providing an identical stimulus for all speakers, you could end up having to count different contexts for rhotic and non-rhotic speakers: for example, Paolillo (2002: 163) discusses the potential lack of word-final underlying /r/ for some speakers. However, for this project, I treated all speakers in a consistent manner in order to avoid making pre-judgements about the phonological systems of individual speakers. In sum: a non-rhotic realisation of a word still counts as a token of coda-*r*, but one that is realised as –. Other realisations are ++ for clearly consonantal surface rhotics, and + for less clearly consonantal realisations, typically *r*-colouring on the preceding vowel. This method of counting surface tokens (which include realised surface *r* and absence of realised *r*) is necessary in order to quantify the proportion of realised surface *r* in each context.

In textbook accounts of rhoticity and *r*-sandhi, where the term 'linking-*r*' is used, it is in the context of a discussion of *r*-sandhi and is a means of acknowledging the differing etymologies

of examples such as *tuner is* and *tuna is*. Giegerich, for example, uses these labels because they are widely used in the literature, but in a claim such as 'both linking and intrusion are systematically confined to non-rhotic varieties of English' (Giegerich 1999: 169), he is arguing that they are the same underlying process, and one that is not applicable to the description of rhotic speech. Both a rhotic and a non-rhotic speaker may pronounce *tuner is* [tʲuːnəɹɪz] but for different reasons: the rhotic speaker could be argued to be resyllabifying an *r* into an onset position (and this *r* would be pronounced even if it could not be in a syllable onset), but the non-rhotic speaker's pronunciation would have to be explained differently, with reference to a hiatus-filling sandhi process. Despite the potential for different motivations for the same surface form, and indeed the fact that 'linking-*r*' does not exist as such for consistently rhotic speakers, I use the term for every speaker in the survey.

The only slight exception to this method of counting sites of potential *r* as tokens, with varying realisations, concerns the phenomenon of hyperdialectal *r* (see Trudgill 1986: 75). A very small number of tokens for a small number of speakers (12 tokens from 6 speakers) were realised with a non-etymological and non-sandhi *r*. For example, speaker Ros12 (a younger Rossendale speaker, see Table 5.1) pronounced one instance of *lager* as [lɑːˈɡəˠ]. These instances of hyperdialectal *r* were very rare in the data, and so are identified separately where they were realised. I did not label every potential site of hyperdialectal *r* in the data as a whole—the vast majority of speakers simply do not have this feature at all, so it would be redundant to label every occurrence of [ə, ɑ, ɔ] that occurred in a non-sandhi context as a token of hyperdialectal *r* that was realised with a – surface form: in all except six speakers all of this transcription effort would just lead to a result of 0% hyperdialectal *r*.

These hyperdialectal-*r* tokens formed a tiny proportion of the tokens and in one case could be regarded as artefacts of the reading-aloud task. Pre25, a speaker who had very low levels of surface coda-*r* (2.8% coda-*r* production in the sentences task), produced a 'hyperrhotic' *r* in the phrase *saw an elephant*. This was not labelled as an intrusive-*r* because there was a noticeable pause in the intrusive context. McCarthy (1993: 173) notes that, 'so long as no actual pause intervenes, intrusive *r* and linking *r* are even obligatory across gaps ... the boundaries of clauses and between intonation phrases'. In the current example from Pre25, there was an actual pause, so a sandhi rule would not be expected to apply. However, it seems she was anticipating the following word with its initial schwa, and this lead to the rhotic in this particular

instance. She did not produce any other hyperrhotic tokens, despite the fact that there were other occasions in the reading list where she introduced a pause after a word ending in [ɔ] or [ə]; again, this suggests that the 'hyperrhotic' token was a one-off. The other 11 hyperrhotic tokens were produced by Rossendale and Accrington speakers, and these are more interesting because in an example such as *lager* as [lɑːˈgəˑ] there is not even the possibility of sandhi rules applying. However, these examples were still very infrequent.

My transcription method allows for an individual speaker's levels of rhoticity and *r*-sandhi to be calculated from data of the same speech style. In the sentences task a level of rhoticity can be calculated from the same set of data as is used to calculate the level of linking-*r* and intrusive-*r*. By its nature, this reading task may cause some style-shifting when compared to spontaneous speech data, in terms of the level of formality (reading a list of sentences may seem to be a more formal speech act than spontaneously speaking in conversational speech), or in terms of the use of a 'performance' speech style when reading aloud. Furthermore, in this reading task, the orthography may have an effect on the resulting speech, given popular notions of correctness and the idea that all letters should be pronounced (cf. prescriptive comments about 'dropping *G*s' or 'dropping *H*s', although in England, where at a national level prestigious speech is non-rhotic, people do not talk about 'dropping *R*s'). Although such potential style-shifting is an unavoidable effect of the use of an orthographic stimulus, it can be controlled for by comparing data on rhoticity and *r*-sandhi from the same task, whether that be conversation, the sentences task, or the elicitation task.

While the conversation task had the tendency to produce very small numbers of potential sites of intrusive *r*, the two remaining tasks, sentences and elicitation, were both designed to generate controlled sets of potential sites of *r*-sandhi to allow some analysis by phonological context and other linguistic factors. The sentences task was intended to produce reasonably naturalistic reading-style speech. The request to read some sentences aloud was not met with any resistance or confusion from any of the participants–after all, it is a familiar activity from school, and indeed some of the older group in particular entered into the task with some gusto, producing a performance speech style rather than a stilted formal speech style. Furthermore, many of the sentences were reasonably likely to occur in everyday speech: saying that 'the ice cream had a vanilla-y taste' for example is a plausible real-world sentence. It is true that some of the sentences were slightly more outlandish, but overall my impression during the interviews

was that the sentences task produced a style of speech not vastly different from conversational speech. I did not notice a tendency for other variables where style shifting might be expected (for example H-dropping) to vary across the speech styles, and again this may have been a result of the reading task generating a performance style of speech rather than a formal style targeting supra-local notions of correctness.

The elicitation task was slightly more removed from everyday speech. First, it involved words in isolation rather than in connected speech. Second, although the activity of adding suffixes to these words was usually clearly understood ('if something reminded you of Bolton you might say it was *Boltonish*' and so on), the sheer amount of repetition of this activity may have led to some speakers producing a speech style that was somewhat mechanical and artificial. Some of the place names were unfamiliar to many participants, so there was occasionally a hesitant quality to their responses. However, there were visual prompts in the form of maps of the North West of England showing the locations of the places (Figures 4.4 and 4.5), which the participants were invited to spend time familiarising themselves with, so I argue that the task did have at least some grounding in a real-world activity. The tasks themselves produce slightly different sets of data: where the sentences task generates a fairly mixed set of word-internal and word-boundary tokens, for instance, the elicitation task produces exclusively word-internal sandhi tokens. On the other hand, the elicitation task produces higher token counts across a controlled set of contexts (particular preceding segments) and so the possibility of individual tokens skewing the results is reduced in the resulting data.

Sometimes collocations such as *war rationing* occured in the conversational speech data. In these examples it is very difficult to judge whether or not the speaker is producing a coda *r* given that the next segment is an onset /ɹ/. Familiarity with the individual speakers' speech patterns during transcription suggests that some speakers do produce a geminate *r* such that *war rationing* is realised as something approximating to [ˈwɔɪˌɹaʃənɪŋ]. A hypothetical utterance such as *straw rationing* would be [ˈstɹɔˌɹaʃənɪŋ]. However, this distinction is a subtle one, so in the interests of consistency of transcription these tokens are not counted as examples of linking *r* or coda *r*.

Hay & Sudbury (2005: 806) do not include certain potential tokens of *r*-sandhi where 'the phonetic environment (but not the phonological) is appropriate'. Examples given include reduced forms of words where a schwa takes the place of a full vowel, and also *h*-dropping. I

have included such forms in my corpus: for some speakers *h*-dropping is so consistent that it seems quite possible that any underlying phonological context for these tokens is *h*-less. I have also included tokens where the presence of a following hesitation particle (typically realised as [ɜː] with no *r* despite the conventional ⟨er⟩ orthography) triggers *r*-sandhi. These tokens occur from time to time in the conversational data, and their existence is interesting when it comes to modelling *r*-sandhi: they support the idea that *r*-sandhi is a regular process which is conditioned by the nature of the following segment rather than solely being based on stored examples.

Some observations were removed from the dataset because, as one-off utterances which are either speech or reading errors, they did not fit into the quantitative analysis when comparing across speakers. For example in the sentences task, Ros11 read 'comma-ing' as 'coming', complete with a FOOT vowel [ʊ] in the first syllable. It would clearly be misleading to regard this as a non-occurrence of intrusive-*r*. In the case of Ros8, she said *vanilla* with no suffix at all when given 'vanilla-y' to read. It could be argued that this non-occurrence of the suffix is an effect of the difficulty encountered when words containing a potential hiatus are to be read aloud. However, it could also be that the -y suffix was not noticed, in which case the issue of filling a hiatus would not even arise. Again, therefore, this particular response was removed.

4.8.2 Collating the transcriptions

A key benefit of the use of ELAN is the ability to search for particular annotations and to hear the relevant section of the original audio recordings. For example, this allowed a great deal of cross-checking of transcriptions, to ensure consistency in coding. However, while straightforward searches can be carried out on the set of .eaf transcription files, any sort of collating of results and carrying out of statistical analysis requires the transcriptions to be transferred to relevant software. By exporting each .eaf file to a tab-delimited text file, I was able to collate all the data from all speakers into a spreadsheet file. I used the OpenOffice spreadsheet (OpenOffice.org 2010), because it is able to import delimited text files containing unicode characters (I used IPA symbols in my annotations). The result was that each tier in my ELAN transcriptions became a column in my spreadsheet. This can be seen in Figure 4.8, which shows an example of a transcribed ELAN file, and Figure 4.9 which shows the same data transferred into a spreadsheet. When all the transcriptions (conversation, sentences and elicitation) were transferred to a single spreadsheet, this was again exported to a comma-separated-values text file, to allow it to be imported into the R statistical environment (R Development Core Team 2010). While some of

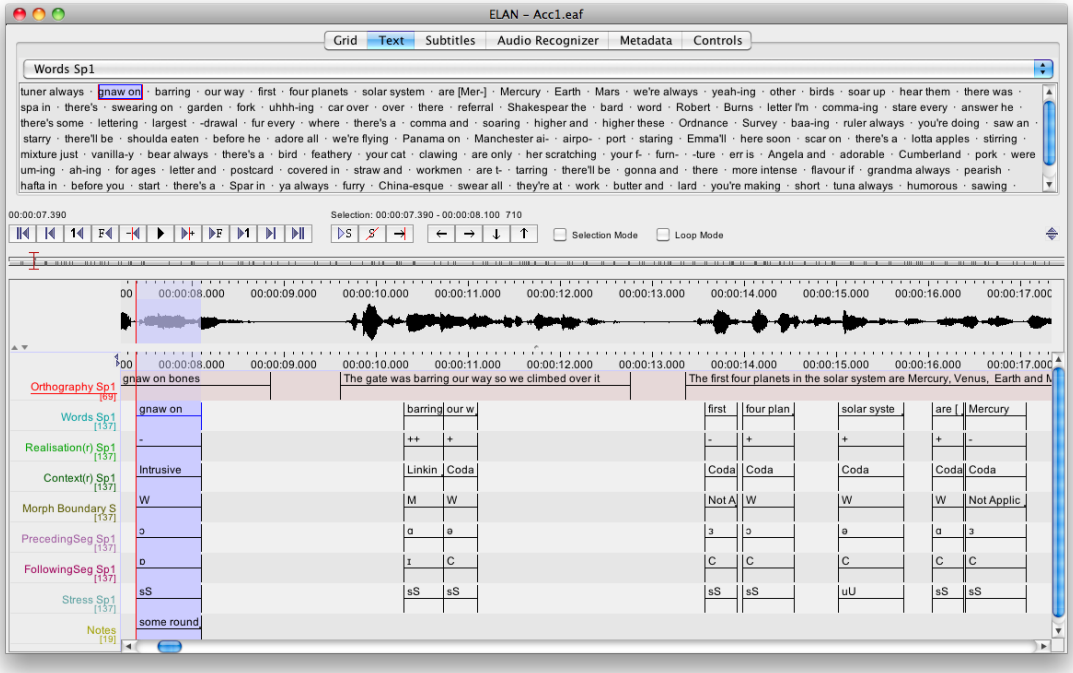
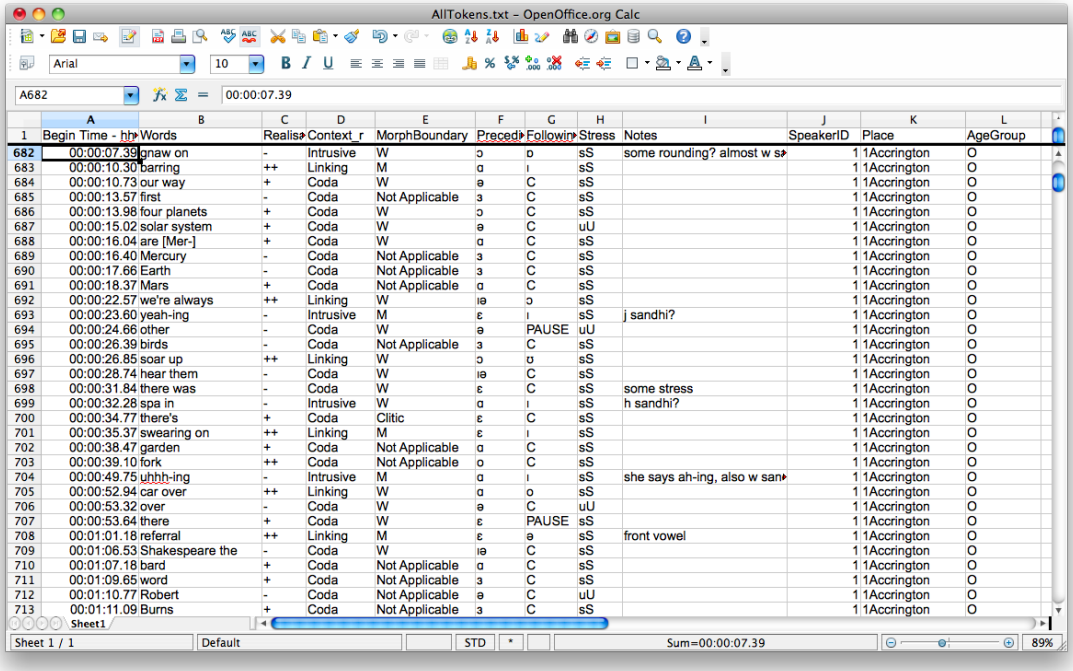


Figure 4.8
ELAN transcription tiers.



	A	B	C	D	E	F	G	H	I	J	K	L
1	Begin Time - hh	Words	Realis	Context_r	MorphBoundary	Preced	Followin	Stress	Notes	SpeakerID	Place	AgeGroup
682	00:00:07.39	gnaw on	-	Intrusive	W	ɔ	ɒ	sS	some rounding? almost w s	1	1Accrington	O
683	00:00:10.30	barring	++	Linking	M	ɑ	ɪ	sS		1	1Accrington	O
684	00:00:10.73	our way	+	Coda	W	ə	C	sS		1	1Accrington	O
685	00:00:13.57	first	-	Coda	Not Applicable	ɜ	C	sS		1	1Accrington	O
686	00:00:13.98	four planets	+	Coda	W	ɔ	C	sS		1	1Accrington	O
687	00:00:15.02	solar system	+	Coda	W	ə	C	uU		1	1Accrington	O
688	00:00:16.04	are [Mer-]	+	Coda	W	ɑ	C	sS		1	1Accrington	O
689	00:00:16.40	Mercury	-	Coda	Not Applicable	ɜ	C	sS		1	1Accrington	O
690	00:00:17.66	Earth	-	Coda	Not Applicable	ɜ	C	sS		1	1Accrington	O
691	00:00:18.37	Mars	+	Coda	Not Applicable	ɑ	C	sS		1	1Accrington	O
692	00:00:22.57	we're always	++	Linking	W	ɪə	ɔ	sS		1	1Accrington	O
693	00:00:23.60	yeah-ing	-	Intrusive	M	ɛ	ɪ	sS	j sandhi?	1	1Accrington	O
694	00:00:24.66	other	-	Coda	W	ə	PAUSE	uU		1	1Accrington	O
695	00:00:26.39	birds	-	Coda	Not Applicable	ɜ	C	sS		1	1Accrington	O
696	00:00:26.85	soar up	++	Linking	W	ɔ	ʊ	sS		1	1Accrington	O
697	00:00:28.74	hear them	-	Coda	W	ɪə	C	sS		1	1Accrington	O
698	00:00:31.84	there was	-	Coda	W	ɛ	C	sS	some stress	1	1Accrington	O
699	00:00:32.28	spa in	-	Intrusive	W	ɑ	ɪ	sS	h sandhi?	1	1Accrington	O
700	00:00:34.77	there's	+	Coda	Clitic	ɛ	C	sS		1	1Accrington	O
701	00:00:35.37	swearing on	++	Linking	M	ɛ	ɪ	sS		1	1Accrington	O
702	00:00:38.47	garden	+	Coda	Not Applicable	ɑ	C	sS		1	1Accrington	O
703	00:00:39.10	fork	++	Coda	Not Applicable	o	C	sS		1	1Accrington	O
704	00:00:49.75	uhhh-ing	-	Intrusive	M	ɑ	ɪ	sS	she says ah-ing, also w san	1	1Accrington	O
705	00:00:52.94	car over	++	Linking	W	ɑ	o	sS		1	1Accrington	O
706	00:00:53.32	over	-	Coda	W	ə	C	uU		1	1Accrington	O
707	00:00:53.64	there	+	Coda	W	ɛ	PAUSE	sS		1	1Accrington	O
708	00:01:01.18	referral	++	Linking	M	ɛ	ə	sS	front vowel	1	1Accrington	O
709	00:01:06.53	Shakespeare the	-	Coda	W	ɪə	C	sS		1	1Accrington	O
710	00:01:07.18	bard	+	Coda	Not Applicable	ɑ	C	sS		1	1Accrington	O
711	00:01:09.65	word	+	Coda	Not Applicable	ɜ	C	sS		1	1Accrington	O
712	00:01:10.77	Robert	-	Coda	Not Applicable	ə	C	uU		1	1Accrington	O
713	00:01:11.09	Burns	+	Coda	Not Applicable	ɜ	C	sS		1	1Accrington	O

Figure 4.9
ELAN tiers transferred to OpenOffice spreadsheet.

the cross-tabulations and production of contingency tables could be carried out in a standard spreadsheet application, R has the advantage of allowing complex series of commands to be re-run on various subsets of data: Baayen (2008: xii) points out how the reuse of multiple commands pasted at the command line prompt is far quicker than clicking buttons on a graphical user interface. Furthermore, the ease of constructing complex sets of commands can actually change analytical approach taken to the data: Baayen claims that, 'this is an area where language determines thought' (2008: xii).

The open nature of the R environment means that new procedures can be added: Rbrul (Johnson 2008), allows multivariate analyses to be carried out: the type of analysis frequently used in variationist sociolinguistics and typically carried out with a version of the VARBRUL program (Cedergren & Sankoff 1974), such as GoldVarb (Sankoff et al. 2005). The benefits of Rbrul are explained in Johnson (2009), and while some of these are theoretical improvements (as discussed in Section 5.2), one particular practical benefit is the ability to use the same file of data to produce a multivariate analysis as well as other forms of descriptive statistics, all within R, rather than having to convert the data to a different format in order to be compatible with GoldVarb.

4.9 Summary

Having devised reading and elicitation tasks and an interview scheme to structure a conversational interview, I carried out fieldwork in Prestwich, Bury, Ramsbottom, Rossendale and Accrington. These localities are situated along a line which runs from a reportedly strongly rhotic area to an area of non-rhoticity. This same line also reflects distance outwards from the large conurbation of Greater Manchester.

Three older and three younger female speakers, selected according to a 'localness' criterion, were recorded in each location.

The recordings were annotated using the ELAN application, and the resulting annotations were exported as tab-delimited text files, which allowed them to be combined into a master spreadsheet file using OpenOffice. The master spreadsheet was saved as a comma-separated-values text file; this master CSV text file was loaded into the R statistical environment, in order to allow various types of statistical analysis to be carried out, from simple contingency tables of frequencies, to significance testing, to the running of multivariate analyses using the Rbrul add-on to the R package.

Chapter 5

Results

5.1 Overview of the East Lancashire data

5.1.1 Size of the dataset

The data for this thesis are transcribed tokens of coda-*r*, linking-*r* and intrusive-*r*. The result of the above coding method is a set of 23,217 tokens, each one tagged for its realisation, context, nature of morphological boundary (where applicable), preceding and following segment, lexical stress/phrasal emphasis, task style and speaker. This resulted in 162,519 annotations in total. The tokens can be analysed as a global set or broken down into subsets by various criteria.

5.1.2 Speaker reference numbers

The East Lancashire data can be examined in terms of data from any individual given speaker, or as mean values for particular cells in the sample (older speakers, younger speakers, speakers from a specific place), or by taking data from one particular speech style (defined by the task that produced the data: conversation, sentences or elicitation), or by including data from all speakers in all speech styles in a global dataset. Each of these approaches has its place, depending on the focus of the discussion at that point, and I adopt various approaches to the data in order to address global patterns in the data, such as the overall distribution of rhoticity and *r*-sandhi, as well as more specific patterns, such as the level of rhoticity for speakers from a particular place.

Every token transcribed is tagged with a speaker reference code, which allows for this variable grouping of speakers into social categories, as well as consideration of an individual speaker's data in isolation. The codes are given in Table 5.1. For ease of reference in some diagrams and discussion I add an abbreviated place name to the speaker reference number (referring to Acc1 or Pre30 for example). As can be seen in Table 5.1, Speaker Ram18 was removed from the results. This was for two reasons: she expressed doubts about her 'localness'

	Accrington	Rossendale	Ramsbottom	Bury	Prestwich
Older	1, 2, 3	7, 8, 9	13, 14, 15	19, 20, 21	25, 26, 27
Younger	4, 5, 6	10, 11, 12	16, 17	22, 23, 24	28, 29, 30

Table 5.1
Speaker reference codes for the East Lancashire data

to Ramsbottom: although she had grown up there, she had also spent considerable time in the Crumpsall suburb of Manchester for family reasons, and decided that she did not feel happy with the idea of being 'born and bred' in Ramsbottom. In addition, this volunteer took part in only some conversational speech, and did not want to take part in the reading or elicitation tasks. The data discussed below were therefore gathered from 29 participants, rather than the planned sample of 30 participants.

5.2 Approaches to data analysis

When analysing sociolinguistic data in the quantitative variationist tradition, distributional analysis and multivariate analysis, typically carried out using VARBRUL software, is often argued to be 'your (analytic) tool of choice' (Tagliamonte 2006: 129). However, parts of the data in this project are comparable to experimental data: the elicitation task in particular was designed to generate a controlled series of tokens in specific phonological contexts. This experimental data is amenable to other forms of statistical analysis, such as ANOVA, that are typically argued to be less appropriate for sociolinguistic data (Tagliamonte 2006: 130). Recent work on developing software for carrying out multivariate analysis of linguistic data (Johnson 2008, Johnson 2009) has addressed the issue of accounting for cross-speaker variation in a multivariate analysis: modern developments in statistical software allow for a mixed model to be investigated, in which the influence of linguistic and non-linguistic factors on the distribution of a linguistic variable can be look at in a way which allows for the random effect of different speakers having produced subsets of the tokens. Multivariate analysis requires that each observation (token) is independent. So, for example, Field (2000: 133) describes an example concerning an investigation of record-company marketing strategies; the dataset contains 200 record releases 'each made by a different band', with the implication that each of these record releases is independent. Clearly, if several of the records were by the same band, which was already successful in terms of record sales, this would affect the reliability of conclusions which attributed different levels of record sales to different marketing strategies. Of course, linguistic data is not like this idealised set of 200

records by 200 different bands: my 29 speakers each contributed several hundred tokens to the dataset. The inability of traditional VARBRUL software such as GoldVarb to account for individual speaker variation is something that has 'never been fully recognized in the variable rule literature' (Johnson 2009: 363). This is important because 'factors such as age, gender and social class are properties of speakers, and so the true significance of such effects depends on the patterning of speakers, not linguistic tokens' (Johnson 2009: 363–4). The ability of new software such as Rbrul to take cross-speaker variation into account means that the resulting multivariate analysis does not under or over-estimate the significance of such external factors to the distribution of the variable (both possibilities are discussed in Johnson 2009: 363).

In approaching an analysis of rhoticity and *r*-sandhi in the East Lancashire data, I use a combination of multivariate analysis and methods such as ANOVA for comparing different cells in the sample population. Where the question concerns possible correlations between rhoticity and *r*-sandhi, non-parametric correlation tests are used, in conjunction with scatterplots to visualise patterns in the data.

In this chapter, I first present an overview of the multivariate analyses of rhoticity and *r*-sandhi carried out on the global data set of East Lancashire tokens. These results indicate task-related effects for linking and intrusive-*r*, so I go on to consider distributional statistics for rhoticity, linking and intrusive-*r*, treating each of the three tasks (conversation, sentences and elicitation) separately. This approach is used to investigate variation across geographical space and over apparent time, as well as to consider the influence of different phonological contexts and potential differences between word-internal and word-final sandhi. Potential correlations between rhoticity and *r*-sandhi are investigated, before the multivariate analyses are discussed in greater detail.

5.3 Overview of multivariate analyses of rhoticity and *r*-sandhi in East Lancashire: is there a task-style effect?

5.3.1 Multivariate analysis of rhoticity in East Lancashire

A mixed-effects multivariate analysis was carried out using Rbrul for the tokens of coda-*r* in the East Lancashire data. This overview investigated the influence of various external and internal factors on the distribution of rhoticity, with individual speaker being treated as a random effect. For the purposes of this multivariate analysis the three-way transcription of realisation of *r* was

collapsed to a binary distinction, with + and ++ tokens being recoded as 'r', given that both + and ++ indicate a degree of *r*-fulness. Tokens transcribed as – were recoded as '0'. Rbrul's best model of the results is given in Figure 5.1. A key finding here is that the task style is not retained as a significant factor affecting the production of coda-*r*: the style of the task does not significantly influence the likelihood of speakers producing coda-*r*. Other details of the results in Table 5.1 will be discussed later in the analysis.

5.3.2 Multivariate analysis of intrusive-r in East Lancashire

Again, a mixed-effect multivariate analysis was carried out using Rbrul, with individual speaker being treated as a random effect. The results are given in Figure 5.2. In this analysis, task style is retained as a significant factor, and after the random effect of individual speaker is added to the model, task style is the first fixed factor to be added. This result indicates that the different task styles are significant in the variation in production of intrusive-*r*. The sentences task style disfavours production of intrusive-*r*. This finding is in line with comments made in the literature on intrusive-*r* that in many varieties of English it is a stigmatised feature: if the sentence task produces a careful stye of speech in which speakers are aiming at an overtly prestigious 'correct' form of speech, then it is not surprising if they try to avoid shibboleths which are the subject of prescriptive comments (McMahon 2000: 245, Wells 1982: 284). A recent letter to *The Guardian* mentions 'that awful English habit of adding an "r" at the end of words like "idea"' (*Guardian* letters, 23 November 2009). However, it could also be that the task produced a slower speech rate than spontaneous speech, which would again mitigate against a sandhi effect such as intrusive-*r* (McMahon 2000: 239). Furthermore, the task involved a written stimulus, so the influence of the orthography in which an intrusive-*r* is obviously not indicated by an orthographic ⟨r⟩ could also mitigate against production of intrusive-*r*. Other details of the factors retained in the model in Figure 5.2 will be discussed later. For the moment, the important point is that task style is a significant factor, so in the discussion of the distributional statistics of the intrusive-*r* data I will consider each task style separately.

5.3.3 Multivariate analysis of linking-r in East Lancashire

Again, a mixed-effect multivariate analysis was carried out using Rbrul, with individual speaker being treated as a random effect. The results are given in Figure 5.3. Figure 5.3 shows that again, task style was a significant factor in the distribution of linking-*r*. In this case, morphological

```
CODA-R

BEST STEP-UP MODEL WAS WITH SpeakerID (random) + PrecedingSegBackness
(1.18e-154) + FollowingSeg (4.56e-63) + MorphBoundary (2.88e-20) +
Place (1.77e-09) + SimpleStress (7.82e-07) + AgeGroup (0.000142) [A]

STEP-UP AND STEP-DOWN MATCH!
STEPPING DOWN:
$PrecedingSegBackness
  factor logodds tokens r/r+0 centered factor weight
    Back   0.668   3729 0.345                  0.661
 NonBack  -0.668   9642 0.172                  0.339

$FollowingSeg
 factor logodds tokens r/r+0 centered factor weight
  PAUSE   0.642   2822 0.299                 0.655
      C  -0.642  10549 0.199                 0.345

$MorphBoundary
         factor logodds tokens r/r+0 centered factor weight
 Not Applicable   0.405   4410 0.262                   0.6
              M   0.303   1359 0.182                 0.575
              W  -0.002   7207 0.210                   0.5
         Clitic  -0.706    395 0.078                  0.33

$Place
      factor logodds tokens r/r+0 centered factor weight
 2Rossendale   2.524   2781 0.528                 0.926
 1Accrington   1.589   2786 0.349                  0.83
 3Ramsbottom  -0.322   2317 0.148                  0.42
       4Bury  -1.400   2736 0.045                 0.198
  5Prestwich  -2.391   2751 0.015                 0.084

$SimpleStress
 factor logodds tokens r/r+0 centered factor weight
      S   0.177   7089 0.271                 0.544
      U  -0.177   6282 0.162                 0.456

$AgeGroup
 factor logodds tokens r/r+0 centered factor weight
      O   0.588   6938 0.257                 0.643
      Y  -0.588   6433 0.180                 0.357


$misc
 deviance df intercept grand mean centered input prob
  8894.66 13    -1.866       0.22               0.134


Current variables are:
response.binary: Realisation_r (r vs. 0)
fixed.factor: MorphBoundary Place AgeGroup TaskStyle SimpleStress
PrecedingSegBackness FollowingSeg
random.intercept: SpeakerID

Random (cross speaker) standard deviation (log odds) 0.696
```

Figure 5.1
Coda-*r* multivariate analysis.

```
INTRUSIVE-R

BEST STEP-DOWN MODEL IS WITH SpeakerID (random) + TaskStyle (5.78e-16) +
PrecedingSeg (5.19e-14) + MorphBoundary (4.11e-11) + Place (0.0197) +
SimpleStress (0.04) [D]
STEP-UP AND STEP-DOWN MATCH!

$TaskStyle
       factor logodds tokens r/r+0 centered factor weight
 Conversation   0.628    198 0.333                  0.652
  Elicitation   0.167   2311 0.524                  0.542
    Sentences  -0.795    720 0.265                  0.311

$PrecedingSeg
 factor logodds tokens r/r+0 centered factor weight
      ɑ   1.057    730 0.562                  0.742
      ɔ   0.393    974 0.453                  0.597
      ɜ  -0.027     16 0.312                  0.493
      ə  -0.331   1382 0.429                  0.418
      ɛ  -1.092    127 0.157                  0.251

$MorphBoundary
 factor logodds tokens r/r+0 centered factor weight
 Clitic   1.472     24 0.625                  0.813
      M  -0.177   2609 0.505                  0.456
      W  -1.295    596 0.228                  0.215

$Place
      factor logodds tokens r/r+0 centered factor weight
  5Prestwich   1.484    674 0.690                  0.815
       4Bury   0.991    702 0.598                  0.729
 1Accrington  -0.633    676 0.314                  0.347
 3Ramsbottom  -0.644    536 0.325                  0.344
 2Rossendale  -1.198    641 0.309                  0.232

$SimpleStress
 factor logodds tokens r/r+0 centered factor weight
      U   0.346   1424 0.435                  0.586
      S  -0.346   1805 0.470                  0.414

$misc
 deviance df intercept grand mean centered input prob
 3094.282 15    -0.293      0.455               0.427

Random (cross speaker) standard deviation (log odds) 1.475

Current variables are:
response.binary: Realisation_r (r vs. 0)
fixed.factor: MorphBoundary PrecedingSeg FollowingSegBackness Place AgeGroup
TaskStyle SimpleStress
random.intercept: SpeakerID
```

Figure 5.2
Intrusive-*r* multivariate analysis.

boundary was added to the model before task style, but task style still contributes very strongly to the likelihood of linking-*r* being produced. This and other aspects of the Rbrul model in Figure 5.3 will be discussed later, but again the key point is that data from the three tasks should be looked at separately when considering the distributional statistics of the linking-*r* data.

5.4 Distribution of rhoticity in East Lancashire

Although task style was not retained as a significant factor in the Rbrul model for the global model of distribution of tokens of coda-*r*, for consistency with the presentation of results for

```
LINKING-R

BEST STEP-DOWN MODEL IS WITH SpeakerID (random) + MorphBoundary (2.54e-45) +
TaskStyle (2.87e-45) + PrecedingSegBackness (1.73e-07) + SimpleStress
(0.00372) + AgeGroup (0.00409) + Place (0.00724) [D]

$MorphBoundary
 factor logodds tokens r/r+0 centered factor weight
      M   1.543   2993 0.978                  0.824
      W  -1.543   3025 0.871                  0.176

$TaskStyle
       factor logodds tokens r/r+0 centered factor weight
 Conversation   1.254   2558 0.925                  0.778
    Sentences  -0.450   1083 0.809                  0.389
  Elicitation  -0.804   2377 0.976                  0.309

$PrecedingSegBackness
   factor logodds tokens r/r+0 centered factor weight
     Back   0.415   2277 0.960                  0.602
 Non-back  -0.415   3741 0.903                  0.398

$SimpleStress
 factor logodds tokens r/r+0 centered factor weight
      U   0.184   2910 0.914                  0.546
      S  -0.184   3108 0.934                  0.454

$AgeGroup
 factor logodds tokens r/r+0 centered factor weight
      O   0.279   3250 0.937                  0.569
      Y  -0.279   2768 0.910                  0.431

$Place
      factor logodds tokens r/r+0 centered factor weight
 2Rossendale   0.556   1144 0.955                  0.635
       4Bury   0.275   1254 0.940                  0.568
 1Accrington   0.003   1254 0.927                  0.501
 3Ramsbottom  -0.306   1069 0.910                  0.424
  5Prestwich  -0.528   1297 0.891                  0.371

$misc
 deviance df intercept grand mean centered input prob
 2644.486 12     3.098      0.924               0.957
Random (cross speaker) standard deviation (log odds) 0.393
STEP-UP AND STEP-DOWN MATCH!

Current variables are:
response.binary: Realisation_r (r vs. 0)
fixed.factor: MorphBoundary PrecedingSegBackness FollowingSegBackness Place
AgeGroup TaskStyle SimpleStress
random.intercept: SpeakerID
```

Figure 5.3
Linking-*r* multivariate analysis.

linking and intrusive-*r* I will present separate figures representing rhoticity in the different tasks. While there are slight differences in levels of rhoticity between the different task styles, these are not significant.

Having collated raw figures for rhoticity in the three task styles, I converted the raw figures to percentages for ease of comparison and visualised them as stacked bar charts (Figure 5.4). Each bar represents the data from all the speakers from a given place. The heights of the differently-shaded levels in each stacked bar effectively represent the mean scores for the three

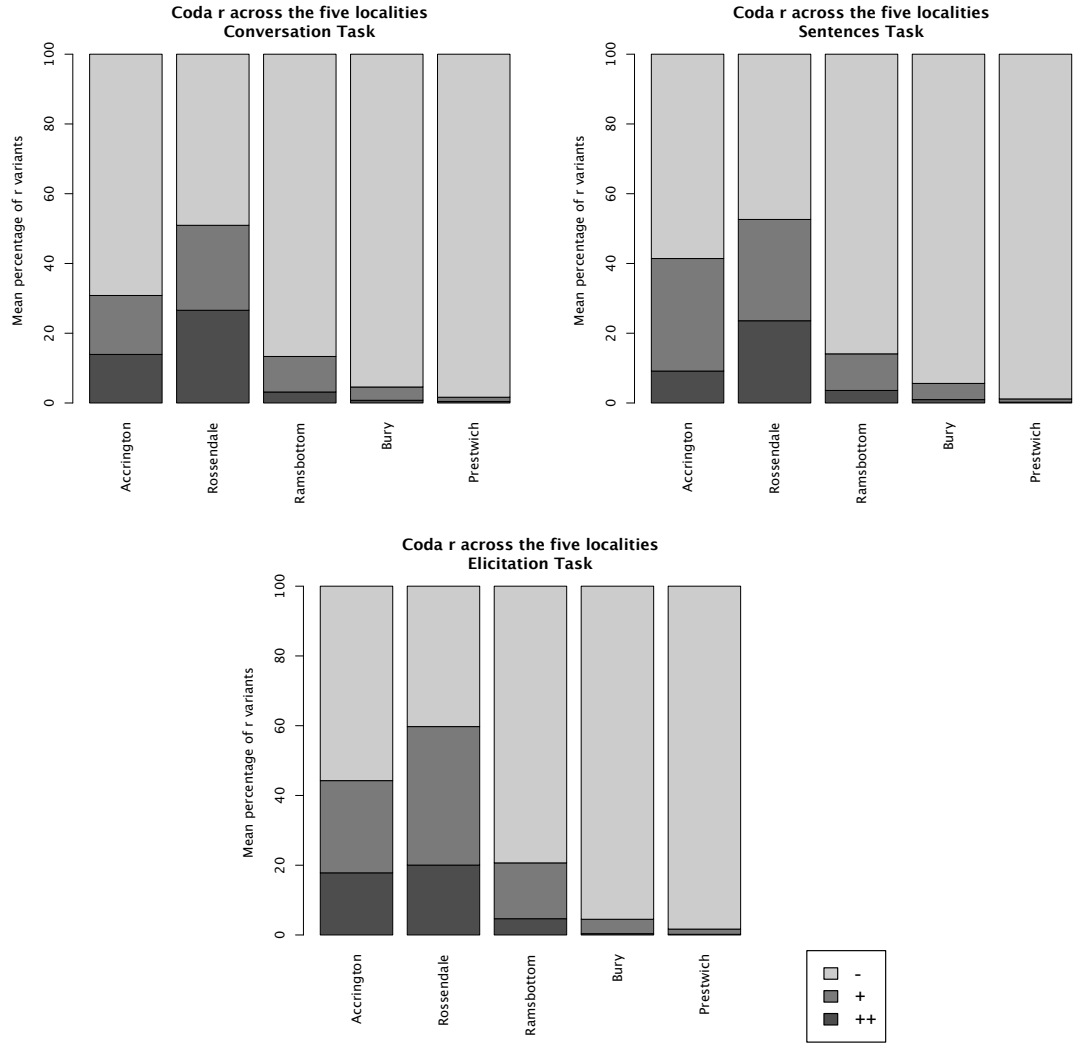


Figure 5.4
Coda-*r* across all localities and all speakers in the the three tasks. ++ and + both indicate rhoticity (++ indicates clear consonantal constriction, + indicates '*r*-colouring' on the preceding vowel); – indicates no audible consonantal constriction. The same shades of grey are used for –, + and ++ in all following bar charts.

variants of *r* for speakers from that place. The token counts for coda-*r* in the three tasks are given in Table 5.2.

5.4.1 Overall patterns in the data for rhoticity

The graphs for rhoticity in Figure 5.4 show a clear pattern across the five localities. Rhoticity is almost categorically absent in the Prestwich data and increases in frequency in Bury and again in Ramsbottom. Overall levels are still low (14% in Ramsbottom, combining tokens coded + and ++), and the increase in frequency from Prestwich to Ramsbottom is largely made up of a growth in *r*-colouring: the rhoticity is both quite infrequent and weaker than would be the case if all tokens were strongly consonantal. However, there still is an increase in rhoticity. There is

	Accrington	Rossendale	Ramsbottom	Bury	Prestwich
Conversation					
–	1277	884	1319	1727	1784
+	312	439	155	69	22
++	257	479	48	14	8
Total	1846	1802	1522	1810	1814
Sentences					
–	256	217	311	387	423
+	141	133	38	19	4
++	40	108	13	4	1
Total	437	458	362	410	428
Elicitation					
–	291	221	357	509	524
+	138	218	72	22	8
++	93	110	21	2	1
Total	522	549	450	533	533

Table 5.2
Raw figures for rhoticity in the three tasks

a much larger increase in levels of rhoticity in Rossendale, which is made up from increases in *r*-colouring and consonantal-*r*. Accrington has slightly lower levels of rhoticity, but these are still much higher than in Prestwich, Bury and Ramsbottom.

To summarise, the rhoticity data show that rhoticity increases with increasing distance from urban Manchester, reaching a high point in Rossendale, and decreases slightly in Accrington. The figures for this variation across geographical space are comparable to the figures for change across time given by Hay & Sudbury (2005) in New Zealand. In the New Zealand data, rhoticity decreased over time; in the East Lancashire data, rhoticity decreases as you move away from Accrington and Rossendale.

The rhoticity data show that the least rhotic speakers are in Prestwich, with Bury and Ramsbottom speakers being progressively more rhotic. Rossendale speakers are the most rhotic, Accrington speakers are slightly less so, and are noticeably lower than Rossendale speakers in the proportion of intermediate *r*-coloured tokens coded +. These differences suggest that there is a continuum with respect to levels of surface coda-*r* production: overall levels of surface coda-*r* increase with distance from Manchester (with a slight reduction between Rossendale and Accrington).

The overall pattern in the data is that Rossendale speakers consistently have the highest mean percentages for surface rhotics (++ and + tokens), with Accrington a close second. Ramsbottom, Bury and Prestwich have progressively lower mean percentages for surface rhotics.

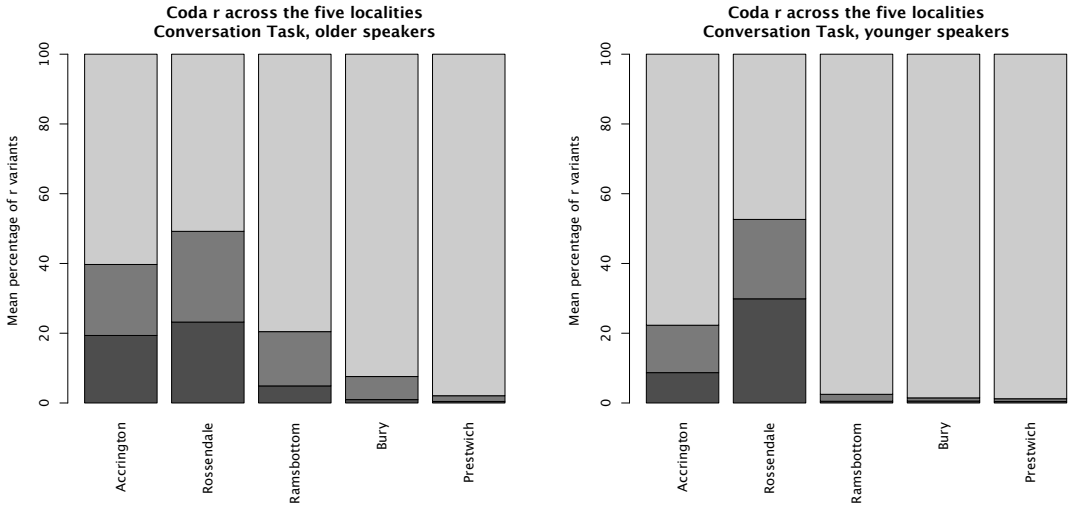


Figure 5.5
Apparent time variation in coda-*r*, conversation task

	Accrington	Rossendale	Ramsbottom	Bury	Prestwich
Older					
–	545	451	731	853	893
+	184	231	143	61	15
++	175	206	45	9	4
Total	904	888	919	923	912
Younger					
–	732	433	588	874	891
+	128	208	12	8	7
++	82	273	3	5	4
Total	942	914	603	887	902

Table 5.3
Raw figures for rhoticity in the conversation task: older and younger speakers

This surface variation requires some analysis if we are to match it to phonological labels of rhoticity: for example, speakers who vary in their surface production of *r* may still all have coda /r/ in underlying representations, but vary in their application of an *r*-deletion rule. Further breaking down of the results by groups of speaker may start to show whether the speakers' surface variation maps onto underlying categoricity.

5.4.2 Apparent time analysis of change in distribution of rhoticity

Figure 5.5 compares older and younger speakers' production of coda-*r* in the conversation task. The raw token counts are given in Table 5.3. The conversation data for coda-*r* show that there is a fairly even increase in levels of rhoticity across the different localities: indeed, if the bars for Accrington and Rossendale were switched round, this pattern would seem very clear

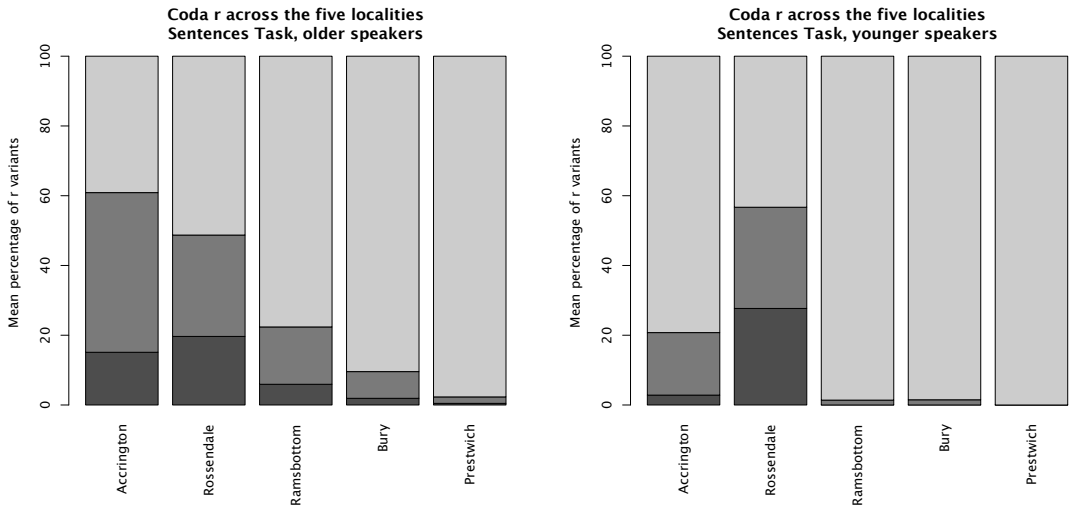


Figure 5.6
Apparent time variation in coda-*r*, sentences task

indeed. Even the most rhotic group of speakers in Rossendale only have a mean level of 49% realised coda-*r*, however. This relatively low percentage could be an indication of an inherent variability in the surface realisation of coda-*r*, although it could also reflect the spontaneous conversational speech being transcribed, in which factors such as the rate of speech could affect the clear articulation of segments.

In contrast, the equivalent conversational data for younger speakers shows a very different pattern, with the Prestwich, Bury and Ramsbottom speakers being almost categorically non-rhotic, and the younger Accrington speakers having a lower mean level of coda-*r* production than their older equivalents. The younger Rossendale speakers have a higher mean level of rhoticity than the older Rossendale group, and this pattern of a widespread reduction in rhoticity coupled with an apparent reinforcement of rhoticity for younger Rossendale speakers is matched in the other datasets (sentences and elicitation tasks) as is shown below in Figures 5.6 and 5.7.

Figure 5.6 compares older and younger speakers' production of coda-*r*. The raw token counts are given in Table 5.4.

The older speakers' variation in coda-*r* shows a very clear pattern, with Prestwich speakers being essentially non-rhotic, and Accrington speakers producing over 60% of potential coda-*r* tokens (counting tokens coded both + and ++ as being indications of rhoticity). The locations between Prestwich and Accrington show progressively more rhoticity from Bury to Ramsbottom to Rossendale. As these locations are spaced quite evenly in (Euclidean) geographical space along a line from Manchester to Blackburn, this chart suggests that for the older speakers there

	Accrington	Rossendale	Ramsbottom	Bury	Prestwich
Older					
–	88	120	170	189	211
+	103	68	36	16	4
++	34	46	13	4	1
Total	225	234	219	209	216
Younger					
–	168	97	141	198	212
+	38	65	2	3	0
++	6	62	0	0	0
Total	212	224	143	201	212

Table 5.4
Raw figures for rhoticity in the sentences task: older and younger speakers

is a transition zone between areas of rhoticity and non-rhoticity, and that rhoticity seems to pattern in a linear relationship with distance from Manchester. The younger speakers' results look very different: the levels of rhoticity in Prestwich, Bury and Ramsbottom are all very low, with the level of rhoticity in Accrington being higher, but less than for the equivalent set of older speakers. The score for younger Rossendale speakers is higher still, and it is even higher than for older Rossendale speakers. These findings indicate a very different pattern of geographical distribution of rhoticity for the younger and older speakers. Rather than a gradient transition zone, the border between Ramsbottom and Rossendale now consists of something more like a sharp isogloss between rhotic and non-rhotic speakers.

This distribution also supports the idea that the *spatiality* of East Lancashire is different for older and younger speakers. The M66 motorway goes as far as just north of Ramsbottom: further north it becomes the A56, which is narrower and more winding. These physical factors may well influence inhabitants' patterns of travel for work and leisure, and hence their potential for contact with speakers of other varieties and their construction of their own spatial identities. Local government boundaries have moved several times from 1974, and now include Ramsbottom within Greater Manchester in the metropolitan borough of Bury. While it is debatable whether there is a tangible effect of administrative boundaries on speakers' behaviour, this issue could again touch on speakers' construction of their own identities. I will return to these ideas in Chapter 6.

The elicitation task figures for coda-*r* for the two age groups are as shown in Figure 5.7. The raw token counts are given in Table 5.5.

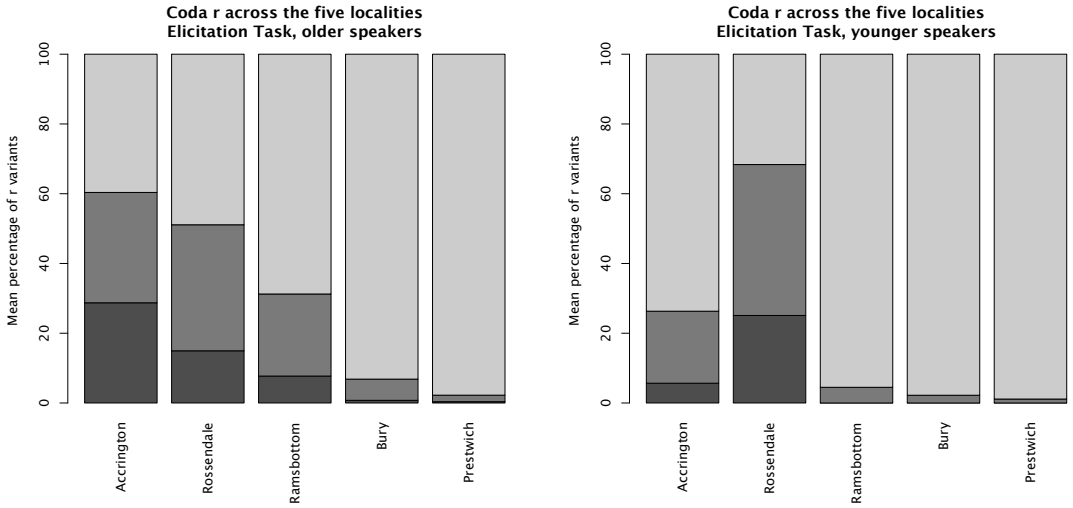


Figure 5.7
Coda-*r* across localities: elicitation task, old and young speakers.

	Accrington	Rossendale	Ramsbottom	Bury	Prestwich
Older					
–	109	134	187	245	262
+	87	99	64	16	5
++	79	41	21	2	1
Total	275	274	272	263	268
Younger					
-	182	87	170	264	262
+	51	119	8	6	3
++	14	69	0	0	0
Total	247	275	178	270	265

Table 5.5
Raw figures for rhoticity in the elicitation task: older and younger speakers

The pattern for older speakers in the elicitation task data is strikingly linear: it really appears that the further geographically you travel north from Manchester, the higher the level of rhoticity you find. Furthermore, this increase in rhoticity is regular, with no sudden jumps from one location to the neighbouring location, and the increase is the same regardless of whether the + and ++ tokens are considered together or separately. There is a slightly larger proportion of *r*-coloured + tokens in Rossendale compared to Accrington, but the results for ++ tokens show a steady increase from Prestwich to Accrington, and the results for the combination of + and ++ indicate a parallel steady increase. This result clearly indicates that the older speakers do vary across a continuum of rhoticity. In contrast, the elicitation task figures for coda-*r* for younger speakers, as shown in Figure 5.7, indicate a strikingly different distribution: the large spike in levels of rhoticity for the Rossendale speakers is very different from the much lower levels of

rhoticity in the other locations. As in the other datasets, the younger Rossendale speakers have a higher level of rhoticity than their older equivalents. In all the other locations the younger speakers have lower levels of rhoticity than the equivalent group of older speakers. The results for Prestwich, Bury and Ramsbottom are all very low, indicating that the young speakers in all these places are essentially non-rhotic: this is mainly a difference for Ramsbottom, where older speakers were partially rhotic. There is still an increasing level of rhoticity from Prestwich to Bury to Ramsbottom, which it would be tempting to regard as the current reflex of the older pattern of increasing rhoticity across these locations. However, the figures are all below 5%, so it is at best a very limited reflection of the earlier pattern.

So, Figures 5.7, 5.6 and 5.5 suggest that there has been a change in the distribution of rhoticity in East Lancashire. The older speakers' data indicate a continuum with levels of rhoticity gradually increasing along the route from Prestwich to Accrington, which suggests that there has been a transition zone where speakers are variable in their production of rhoticity: older Prestwich speakers are essentially non-rhotic, older Accrington speakers realise coda-*r* 60% of the time (including + and ++ tokens as examples of rhoticity), and older speakers in the intermediate places realise a proportion of coda-*r* that appears to link to their distance from Manchester, with levels of rhoticity decreasing the nearer to Manchester the speaker lives. The younger speakers' data suggest that there is now a much more focused transition zone between Ramsbottom and Rossendale. This results from the fact that the younger Ramsbottom speakers produce a smaller proportion of coda-*r* than their older equivalents and the younger Rossendale speakers produce a larger proportion of coda-*r* than their older equivalents. The effect is that, rather than a gradual transition zone extending geographically from Prestwich to Accrington, the younger speakers seem to reflect the presence of effectively an isogloss: a sharp transition between speakers in Ramsbottom and Rossendale, with young Ramsbottom speakers being non-rhotic, and young Rossendale speakers being 69% rhotic. Interestingly, there seems to be a divide between young speakers in Rossendale and Accrington too. While this difference is not quite so large as that with Ramsbottom, it does indicate that younger Accrington speakers have a lower level of rhoticity than their older equivalents, and that there is now quite a sharp difference between levels of rhoticity in young speakers in Accrington and Rossendale. There may be socio-spatial explanations for this apparent isogloss (including the fact that Rossendale

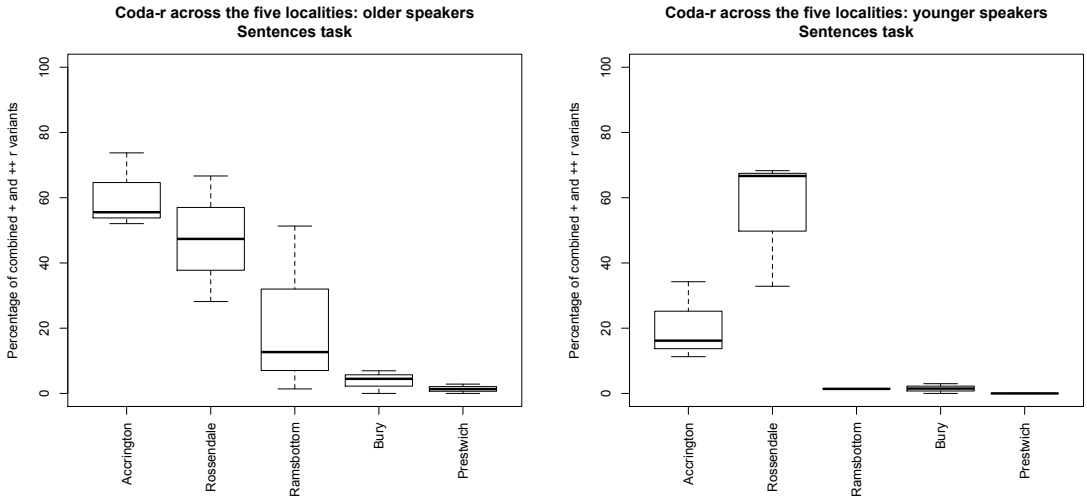


Figure 5.8
Apparent time variation in coda-*r*, sentences task; visualisation of Tukey's HSD test. For older speakers, coda-*r* sentences task: ANOVA $F(4,10) = 8.57$, $p = 0.003$. Kruskal-Wallis rank-sum H(4) = 10.66, $p = 0.031$. Mean values: Acc 60.5%, Ros 47.4%, Ram 21.8%, Bur 3.8%, Pre 1.4%. For younger speakers, coda-*r* sentences task: ANOVA $F(4,9) = 13.65$, $p = 0.001$. Kruskal-Wallis rank-sum H(4) = 11.42, $p = 0.022$. Mean values: Acc 20.6%, Ros 55.9%, Ram 1.4%, Bur 1.49%, Pre 0%.

is more rural than the other locations, and is relatively isolated) and these will be discussed in the next chapter.

Having established that there does seem to be a difference in the distribution of rhoticity for younger and older speakers, I will next consider the distribution of rhoticity across the different places in the survey.

5.4.3 Significance of difference in levels of rhoticity across different places

Figure 5.8 shows the realisation of coda-*r* for older and younger speakers in the sentences task. These plots show the same data as Figure 5.6 (this time grouping + and ++ tokens together as surface manifestations of some rhoticity). Rather than just indicating the mean percentages of rhoticity in each place, these boxplots make clear the extent of variation within the sample in each place: the two 'whiskers' extending from the top and bottom of the box represent the minimum and maximum values and the thick line in the box represents the median value. For older speakers, while the same overall gradual increase in levels of realised coda-*r* is evident, as was seen in the barchart in Figure 5.6, the boxplot shows that the places with the most variation within their samples are Ramsbottom and Rossendale. If there is a transition zone for levels of rhoticity, then in practice this means that there is a mixed population of speakers in Ramsbottom and Rossendale. Some of these speakers are very similar to Prestwich or Bury speakers, having

low levels of rhoticity. Others are more like Accrington speakers, with much higher levels of rhoticity.

Determining statistical significance requires an answer to the question of whether these five samples are from five populations (in other words people from Accrington really are 'different' from people from Rossendale and so on), or whether they are samples from a more general population.

Fasold (1984: 99) describes the hypothesis that can be tested with an ANOVA thus: 'whether or not the ... samples are drawn from the same population, with respect to the characteristic for which there are measurements. In less technical terms, you want to find out if the ... subsets are significantly different with respect to the measured characteristic'. With my data, the null hypothesis H_0 is that the distribution shown in each panel in Figure 5.8 occurs from selection of five samples from a general population. H_1 is that the five populations are not from the same population. The results of a one-way ANOVA for the data for older speakers (the left panel of Figure 5.8) give $F(4, 10) = 8.57$, $p = 0.003$. This level of significance allows me to reject H_0 and claim that the difference in levels of rhoticity in the five locations is significant.

There are large differences in the variance for each sample group (see Baayen 2008: 108), so a non-parametric test is used to see whether it also provides support for the hypothesis that the sample groups come from different populations. The Kruskal-Wallis rank sum test has a lower statistical power than ANOVA, which means that it is more likely to reject as non-significant an effect which actually is significant. However, it too produces a significant result at $\alpha < 0.05$: ($H(4) = 10.66$, $p = 0.031$).

The right hand panel of Figure 5.8 shows the realisation of coda-*r* for younger speakers in the sentences task. An ANOVA gives $F(4, 9) = 13.65$, $p = 0.001$. The Kruskal-Wallis rank sum test gives ($H(4) = 11.42$, $p = 0.022$).

Although the results of an ANOVA indicate a statistically significant difference between the means for the five sample groups for both the younger and older speakers, another test is required to show which individual differences in the means between groups contribute to this significance. I could carry out individual *t*-tests on each possible pairing of sample groups, which would result in 10 individual tests being required. However, repeating *t*-tests in this way hugely increases the likelihood that at least one of them would be significant at the 0.05 level: the likelihood of at least one significant difference would become 0.4. The Tukey's HSD test is

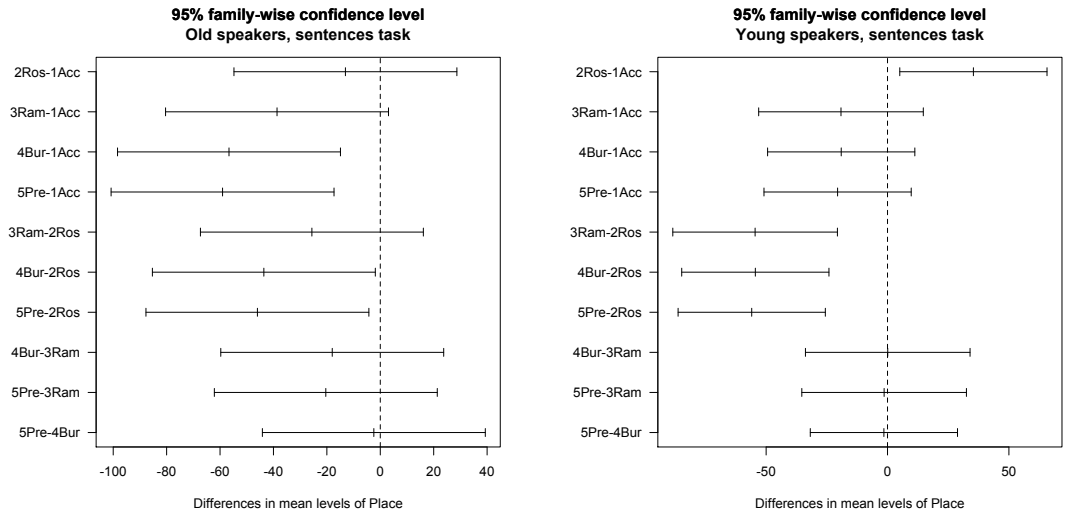


Figure 5.9
Pairwise comparisons between sample groups for coda-*r* in the sentences task.

	diff	lwr	upr	p adj
2Ros-1Acc	-13.052083	-54.78769	28.683520	0.8365455
3Ram-1Acc	-38.659872	-80.39547	3.075731	0.0727795
4Bur-1Acc	-56.646098	-98.38170	-14.910495	**0.0082599**
5Pre-1Acc	-59.056625	-100.79223	-17.321022	**0.0062375**
3Ram-2Ros	-25.607789	-67.34339	16.127813	0.3235051
4Bur-2Ros	-43.594015	-85.32962	-1.858413	**0.0398227**
5Pre-2Ros	-46.004542	-87.74014	-4.268939	**0.0296508**
4Bur-3Ram	-17.986226	-59.72183	23.749376	0.6307612
5Pre-3Ram	-20.396753	-62.13236	21.338850	0.5242706
5Pre-4Bur	-2.410527	-44.14613	39.325076	0.9996533

Table 5.6
Results of a Tukey's HSD test for coda-*r* in the sentences task for older speakers

one means of dealing with this problem (Field 2000: 275, Baayen 2008: 106), and visualisations of the results are given in Figure 5.9. The comparisons that are significant at the 0.05 level are those which do not intersect the dashed zero line (see Baayen 2008: 106). This can be seen by comparing the left panel of Figure 5.9 to Table 5.6, which contains the numerical results for differences in level of coda-*r* for older speakers in the sentences task. The significant differences between samples are in bold face.

In the sample of older speakers there are significant differences between Accrington and Bury, Accrington and Prestwich, Rossendale and Bury, and Rossendale and Prestwich. The other differences are not significant. These results suggest that Accrington and Rossendale potentially have one system for rhoticity, whereas Bury and Prestwich have another. The Ramsbottom sample is not significantly different from any other individual sample, which reflects the fact that it appears to be a very mixed sample, as shown in the left panel of Figure 5.8, where there

are overlaps both with the Accrington-Rossendale speakers at one extreme of the Ramsbottom figures, and with the Bury-Prestwich speakers at the other extreme.

The results for younger speakers are also interesting: this time the only sample group that is significantly different from the others is the Rossendale group. No pairwise combination of Accrington/Ramsbottom/Bury/Prestwich gives a significant difference. The idea of a shrinking 'island of rhoticity' is supported by the apparent-time analysis of the East Lancashire data: although historically, Accrington speakers were different from Prestwich speakers, as is apparent in the data for older speakers, there has been a change in the distribution of rhoticity such that Accrington and Prestwich younger speakers are now part of the 'sea' of non-rhoticity, leaving Rossendale speakers on a smaller 'island' of rhoticity.

Coda-*r* data from the elicitation task is shown in Figure 5.10. The distributions for both groups of speakers are significant: older speakers $p = 0.02$, younger speakers $p = 0.03$. The results of a Tukey's HSD test show that the same groupings of samples are evident in the elicitation task data as were shown in the sentences task data. For older speakers there are significant differences between Accrington/Rossendale and Bury/Prestwich, with Ramsbottom speakers not being significantly different from either group. For younger speakers the Rossendale sample is significantly different from all other places.

The equivalent boxplots and representations of the Tukey's HSD tests for coda-*r* in the conversational data are given in Figure 5.11. The global multivariate analysis of the data suggest that the conversation data for coda-*r* should show a similar pattern to the equivalent data from the other tasks. However, there are actually some differences. For younger speakers, while Rossendale remains significantly different from all other samples, Accrington is in the conversational data significantly different from both Rossendale and from Bury and Prestwich (there only just fails to be a significant difference between Ramsbottom and Accrington). This difference suggests that the young Accrington speakers are metaphorically on a separate, less-consistently rhotic, island of rhoticity from the Rossendale speakers. This result is an artefact of the conversational data, which contains less variation in levels of rhoticity for speakers in each place. Effectively, there is evidence for a degree of style shifting: for example, while young Accrington speakers are reasonably consistently rhotic at about a 20% level in the conversation data, in the elicitation task data some speakers are more rhotic and others slightly less rhotic.

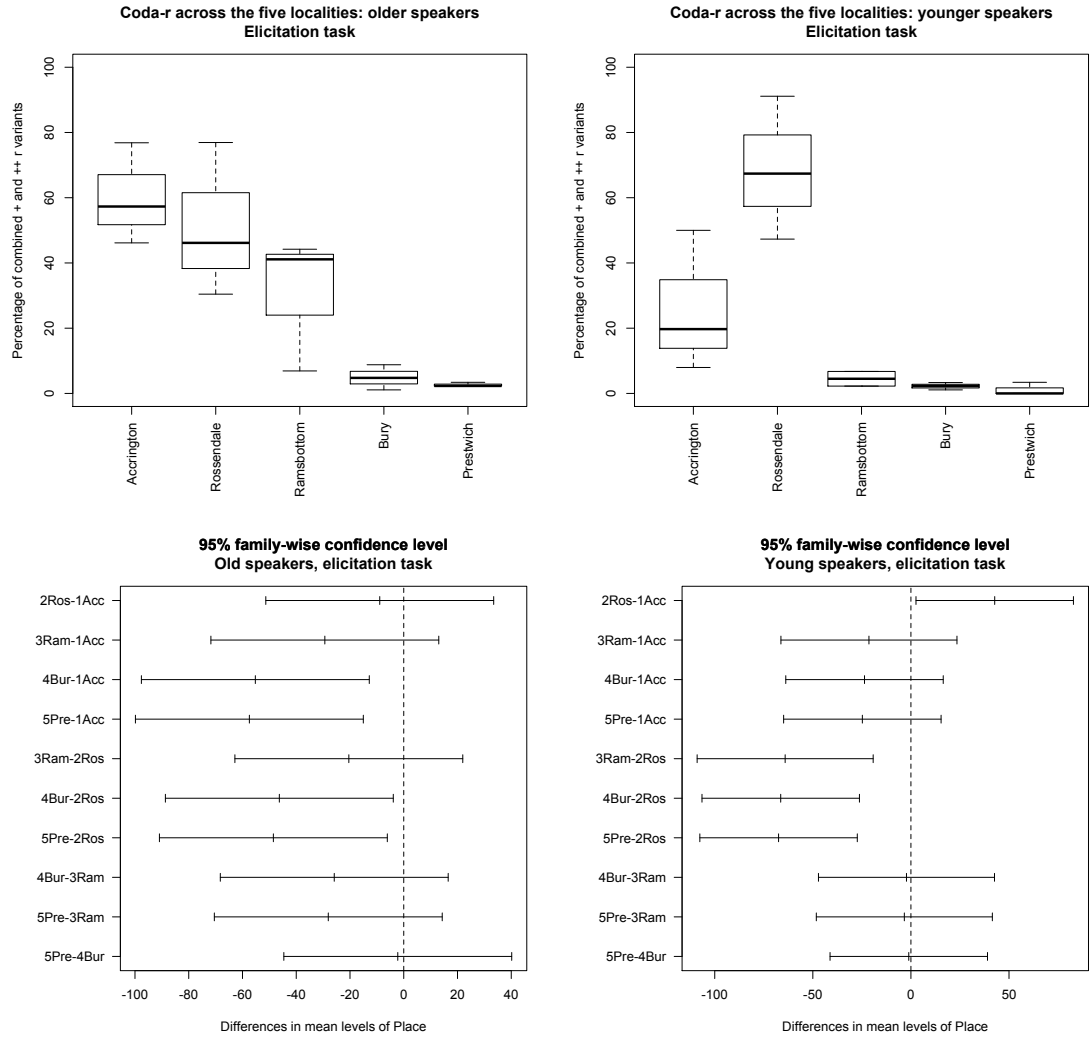


Figure 5.10
Elicitation task. Apparent time variation in coda-*r*; visualisation of Tukey's HSD test. For older speakers, ANOVA $F(4,10) = 8.24$, $p = 0.003$. Kruskal-Wallis rank sum test ($H(4) = 11.14$, $p = 0.024$). Mean values: Acc 60.1%, Ros 51.2%, Ram 30.7%, Bur 4.9%, Pre 2.7%. For younger speakers, ANOVA $F(4,9) = 11.29$, $p = 0.001$. Kruskal-Wallis rank sum test ($H(4) = 10.59$, $p = 0.032$). Mean values: Acc 25.9%, Ros 68.6%, Ram 4.49%, Bur 2.23%, Pre 1.14%.

The significance testing for the distribution of coda-*r* in the data suggests that there is evidence of a change in apparent time, such that rhoticity is becoming more geographically restricted, with a focus on Rossendale. The data for older speakers suggest that there was a transition zone between rhotic and non-rhotic areas, with Ramsbottom being characterised by a mixed population. The boxplots show that although the mean values for older Ramsbottom speakers are in between the lower levels of rhoticity found in Bury and Prestwich and the higher levels of rhoticity found in Rossendale and Ramsbottom, these mean values arise from inter-speaker variation. Some older Ramsbottom speakers are similar to Bury/Prestwich speakers; other older Ramsbottom speakers are more like Rossendale/Ramsbottom speakers. The levels of

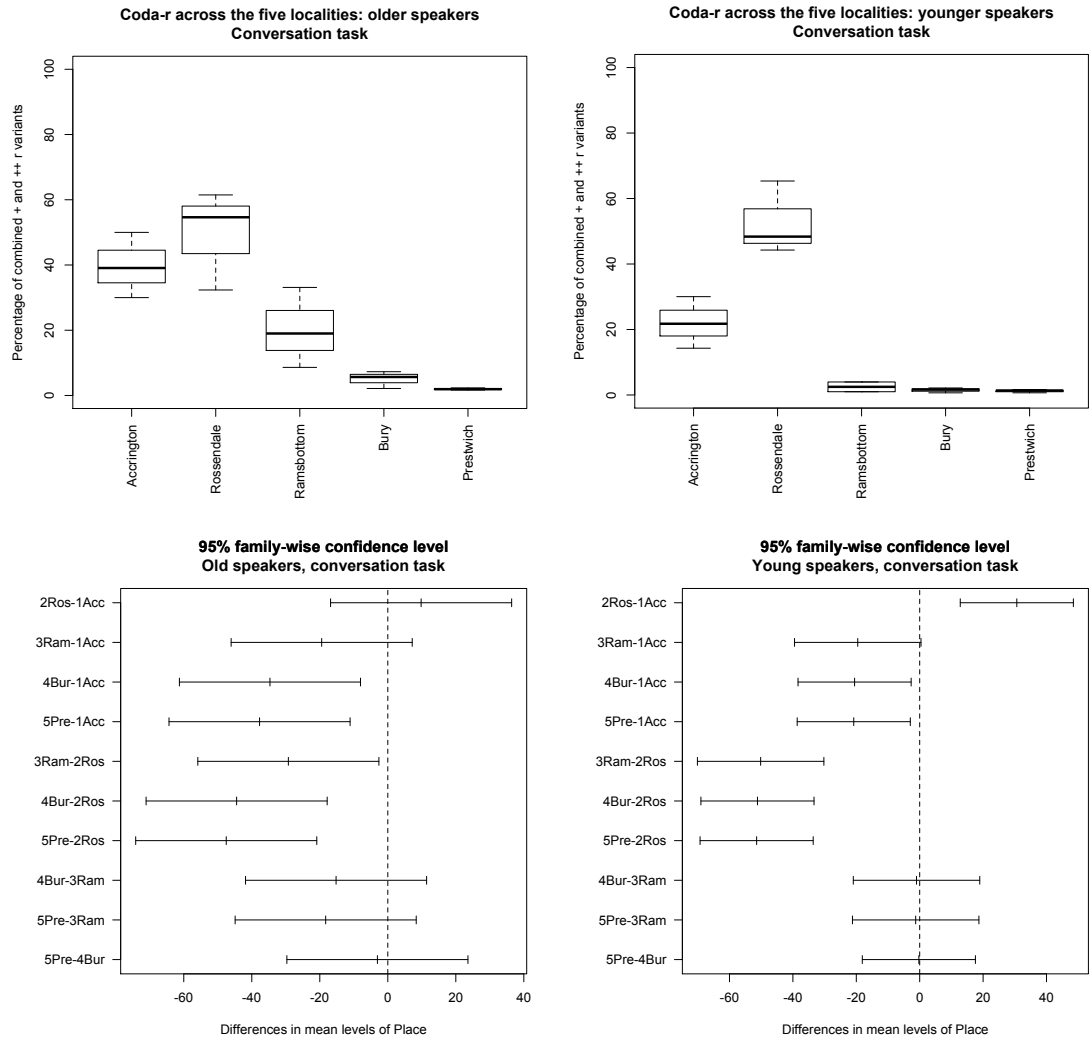


Figure 5.11
Conversation task. Apparent time variation in coda-*r*; visualisation of Tukey's HSD test. For older speakers, coda-*r* conversation task: ANOVA $F(4,10) = 13.39$, $p = 0.001$. Kruskal-Wallis rank-sum H(4) = 11.97, $p = 0.018$. Mean values: Acc 39.7%, Ros 49.5%, Ram 20.2%, Bur 5.0%, Pre 2.0%. For younger speakers, coda-*r* conversation task: ANOVA $F(4,9) = 34.22$, $p < 0001$. Kruskal-Wallis rank-sum H(4) = 10.53, $p = 0.032$. Mean values: Acc 22.0%, Ros 52.7%, Ram 2.49%, Bur 1.48%, Pre 1.22%.

rhoticity are interesting too: at the lower end, speakers in Prestwich approach categoricity in never producing a surface coda-*r*, but at the higher end, speakers peak at around 80% rhoticity (although one younger Rossendale speaker produced a very high score in the elicitation task).

5.5 Distribution of linking-*r* in East Lancashire

The overall figures for linking-*r* in the data are given in Table 5.7 and represented by the charts in Figure 5.12.

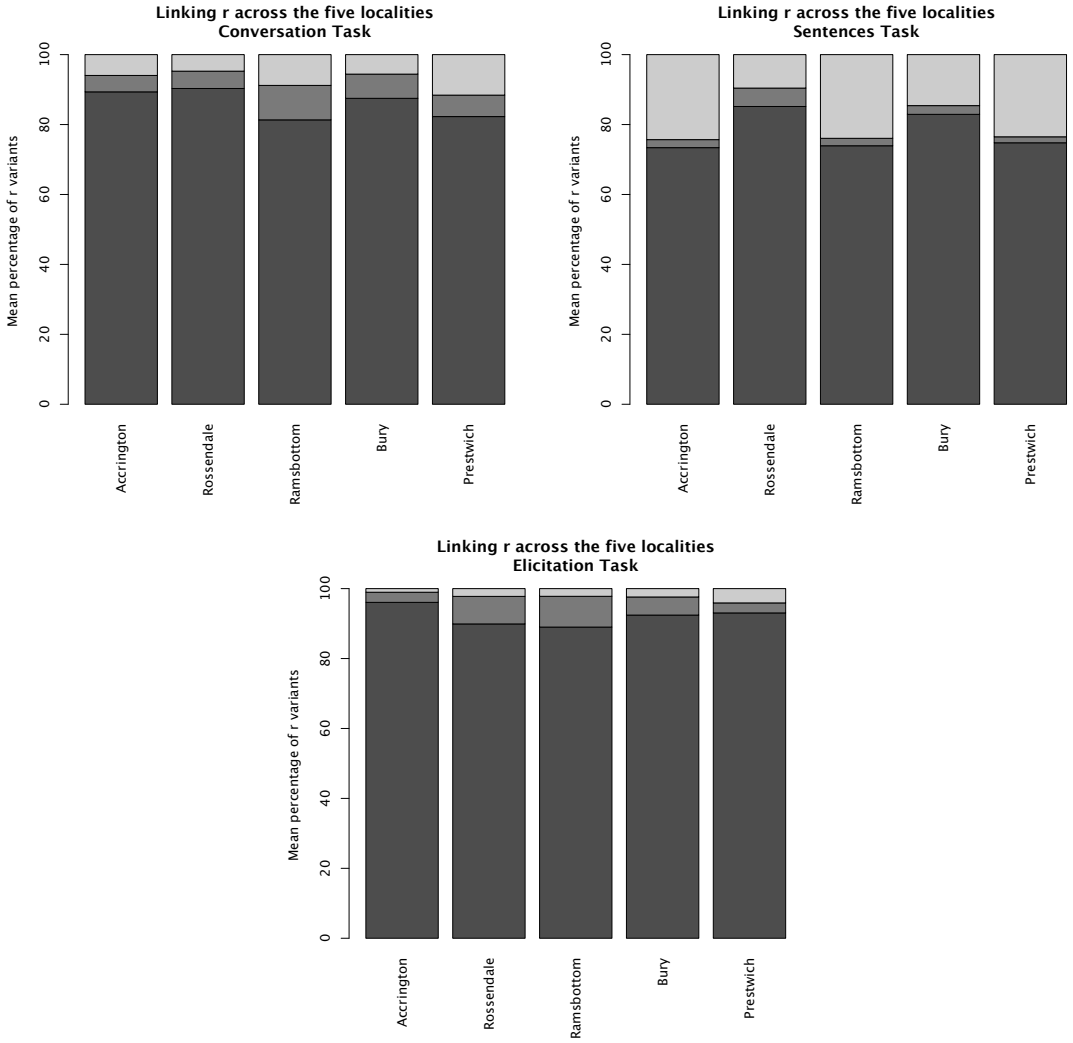


Figure 5.12
Linking-*r* across all localities and all speakers in the the three tasks.

*5.5.1 Overall patterns in the data for linking-*r

The distributional statistics for linking-*r* show very little apparent variation at all across different geographical locations: linking-*r* is fairly consistently realised with ++ in all locations, despite the different levels of rhoticity evident in speakers from different locations. There is a slight difference between tasks (task style was a significant factor influencing the production of linking-*r* in the multivariate analysis of the global dataset). The sentences task produces the lowest overall rates of linking-*r* (although these are still high at 75%+). The conversation task leads to higher rates of linking-*r* production and the elicitation task produces almost categorical realisation of linking-*r*. The nature of the tasks again provides potential explanations for these differences. If the sentences task leads to a careful speech style, potentially at a slightly slower speech rate

	Accrington	Rossendale	Ramsbottom	Bury	Prestwich
Conversation					
–	33	21	42	29	68
+	26	22	47	36	36
++	495	401	388	455	483
Total	554	444	477	520	587
Sentences					
–	53	20	45	35	55
+	5	11	4	6	4
++	160	178	139	199	175
Total	218	209	188	240	234
Elicitation					
–	5	11	9	12	20
+	14	39	36	26	14
++	464	445	364	464	455
Total	483	495	409	502	489

Table 5.7
Raw figures for linking-*r* in the three tasks

than conversational speech, then the incidence of sandhi phenomena such as linking-*r* may be expected to be lower. The elicitation task generated repeated sandhi-contexts, and furthermore these were word-internal, so the increased rate of linking-*r* here may reflect this morphological bias in the data generated by the task.

Clearly, more detailed analysis is required for the linking-*r* data, in order to investigate the difference between word-internal and word-boundary linking-*r* and the potential for a change in apparent time.

5.5.2 Word-internal linking-r

Word-internal linking-*r* is near categorical for all speakers in all places, as can be seen in Figure 5.13 and Table 5.8. There are slight differences in the levels of + and ++ tokens, but if both are taken as indications of *r*-ful realisations, then there is very little variation. The younger Rossendale speakers, who were the most consistently rhotic, do have the lowest level of word-internal linking-*r*, but their level of + and ++ combined is still very high indeed at 95%. Given this lack of variation, if any patterns in distribution of linking-*r* are to be found, word-boundary tokens must be considered.

5.5.3 Apparent time analysis of change in distribution of word-boundary linking-r

By its nature, the elicitation task does not produce word-boundary tokens; I will use data from the conversation task and the sentences task in order to consider the possibility of a change in

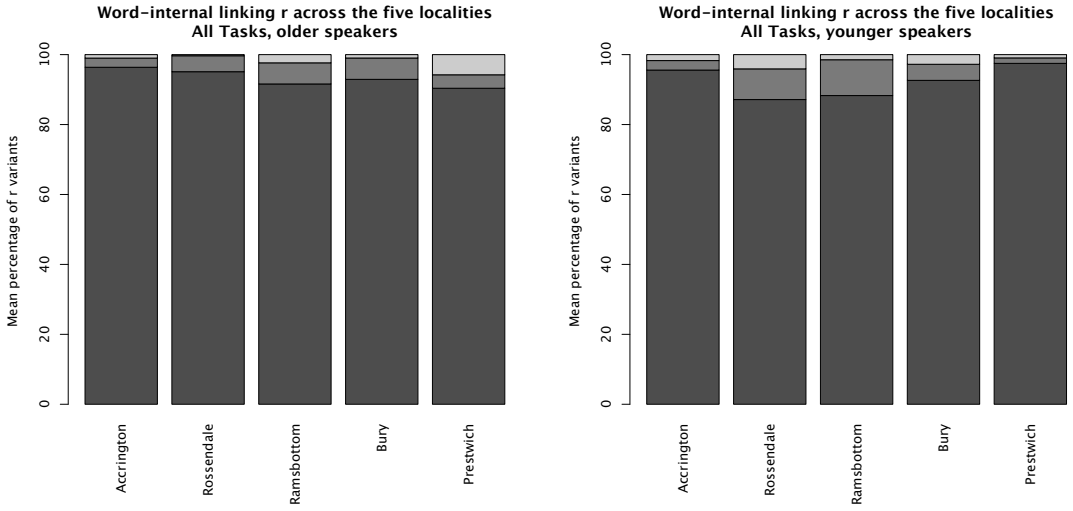


Figure 5.13
Word-internal linking-*r* in all tasks, older and younger speakers.

	Accrington	Rossendale	Ramsbottom	Bury	Prestwich
Older					
–	3	1	7	3	18
+	8	14	18	19	12
++	293	292	273	289	282
Total	304	307	298	311	312
Younger					
–	5	13	3	9	3
+	8	28	21	15	5
++	281	278	181	302	312
Total	294	319	205	326	320

Table 5.8
Raw figures for word-boundary linking-*r* in the conversation task: older and younger speakers

word-boundary linking-*r* over apparent time in the five locations. The conversation task data for older and younger speakers are shown in Figure 5.14 and Table 5.9. There is an overall reduction in the linking-*r* rates for younger speakers, but this is very slight in most locations, especially when compared to the quite dramatic differences in rhoticity over apparent time for these locations. The biggest difference is in the data for Ramsbottom, although even here the younger speakers are still producing ++ or + in word-boundary linking-*r* contexts 86% of the time.

The apparent-time data for realisation of word-final linking-*r* in the sentences task are represented in Figure 5.15, with the raw figures in Table 5.10. The sentences task results for older speakers suggest that although there is a clear difference in levels of rhoticity across the different places (see Figure 5.6) this does not clearly map onto the variation in word-final

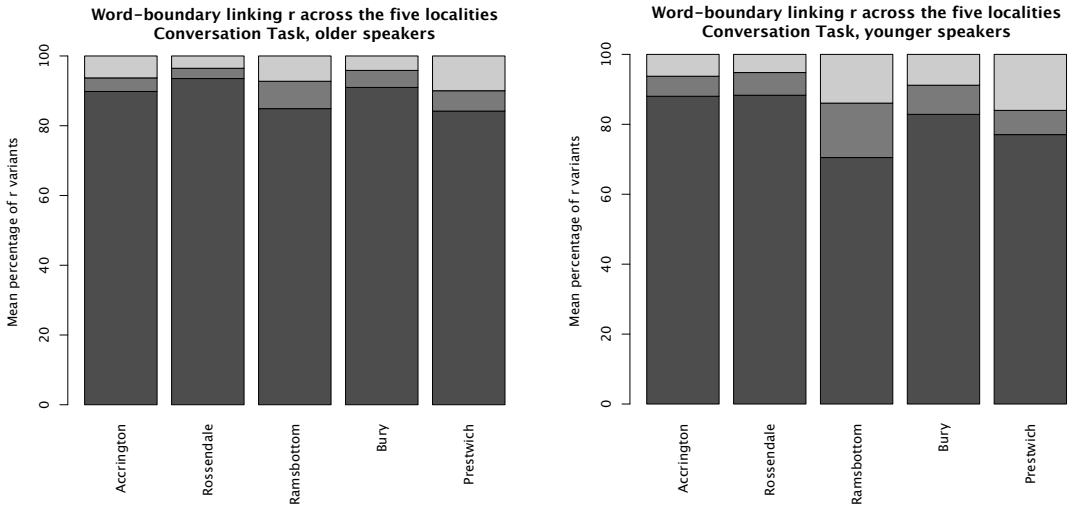


Figure 5.14
Word-boundary linking-*r* in the conversation task, older and younger speakers.

	Accrington	Rossendale	Ramsbottom	Bury	Prestwich
Older					
–	21	6	24	11	29
+	13	5	26	13	17
++	300	159	281	242	245
Total	334	170	331	266	291
Younger					
–	12	12	17	18	37
+	11	15	19	17	16
++	169	204	86	169	178
Total	192	231	122	204	231

Table 5.9
Raw figures for word-boundary linking-*r* in the conversation task: older and younger speakers

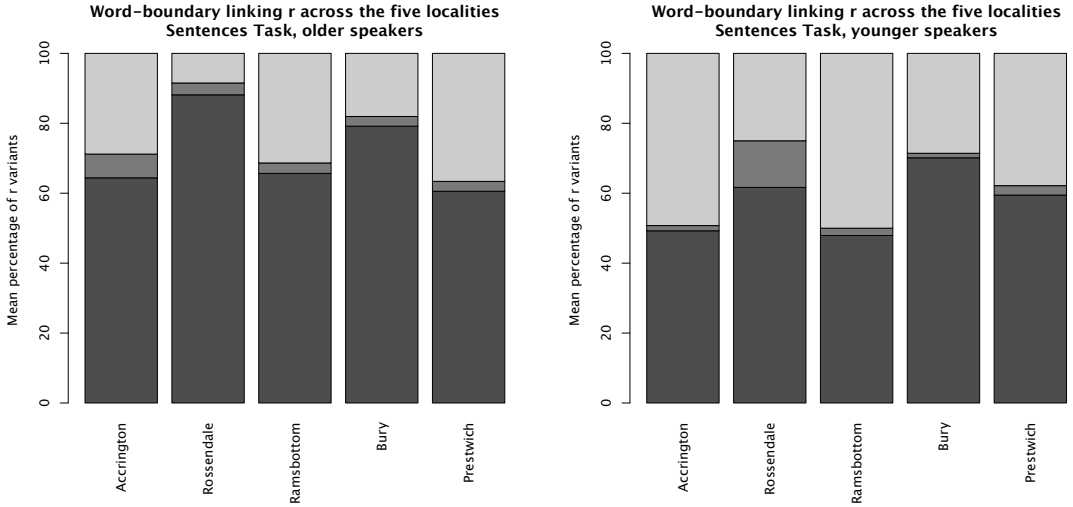


Figure 5.15
Apparent time variation in word-final linking-*r*, sentences task.

	Accrington	Rossendale	Ramsbottom	Bury	Prestwich
Older					
–	17	5	21	13	26
+	4	2	2	2	2
++	38	52	44	57	43
Total	59	59	67	72	71
Younger					
–	33	15	24	22	28
+	1	8	1	1	2
++	33	37	23	54	44
Total	67	60	48	77	74

Table 5.10
Raw figures for word-boundary linking-*r* in the sentences task: older and younger speakers

linking-*r*. There is a gradual progressive reduction in levels of linking-*r* from Accrington to Ramsbottom to Prestwich, which is in the same direction as the much steeper reduction in rhoticity between the same three localities. This difference would support Hay & Sudbury's finding that 'as speakers become less rhotic, their use of /r/ at word-boundary linking positions also declines' (2005: 809). However, there are clear peaks for Rossendale and Bury speakers which do not fit this generalisation.

The data for younger speakers are even harder to relate to levels of rhoticity. While there is an across-the-board lowering of levels of linking-*r* compared to the older speakers, this does not consistently match a lowering of rhoticity: indeed, the younger Rossendale speakers are more consistently rhotic than their older equivalents, but produce fewer tokens of linking-*r*. There could be evidence here that what looks like apparently the same linguistic behaviour in terms of surface output is motivated by different mechanisms. For example, if two speakers both produce an *r* in a linking context, but one is rhotic and the other non-rhotic, different mechanisms may lead to the same result on the surface (resyllabification of a segment which would surface anyway versus a sandhi process of hiatus-filling). It could be that while the link between level of linking-*r* and level of coda-*r* applies to speakers who have a mixed system where rhoticity is variable, it does not apply to speakers who are consistently non-rhotic. Such speakers would have stabilised a sandhi linking-*r* process, so the apparent lowering in levels of linking-*r* over time as rhoticity was being lost would stop and levels of surface linking-*r* would increase as a result of the new sandhi motivation for production of linking-*r*. The Prestwich speakers, who are consistently non-rhotic, would be expected to have a fully productive system of *r*-sandhi leading to consistent realisation of linking-*r*. It is interesting then, that linking-*r*

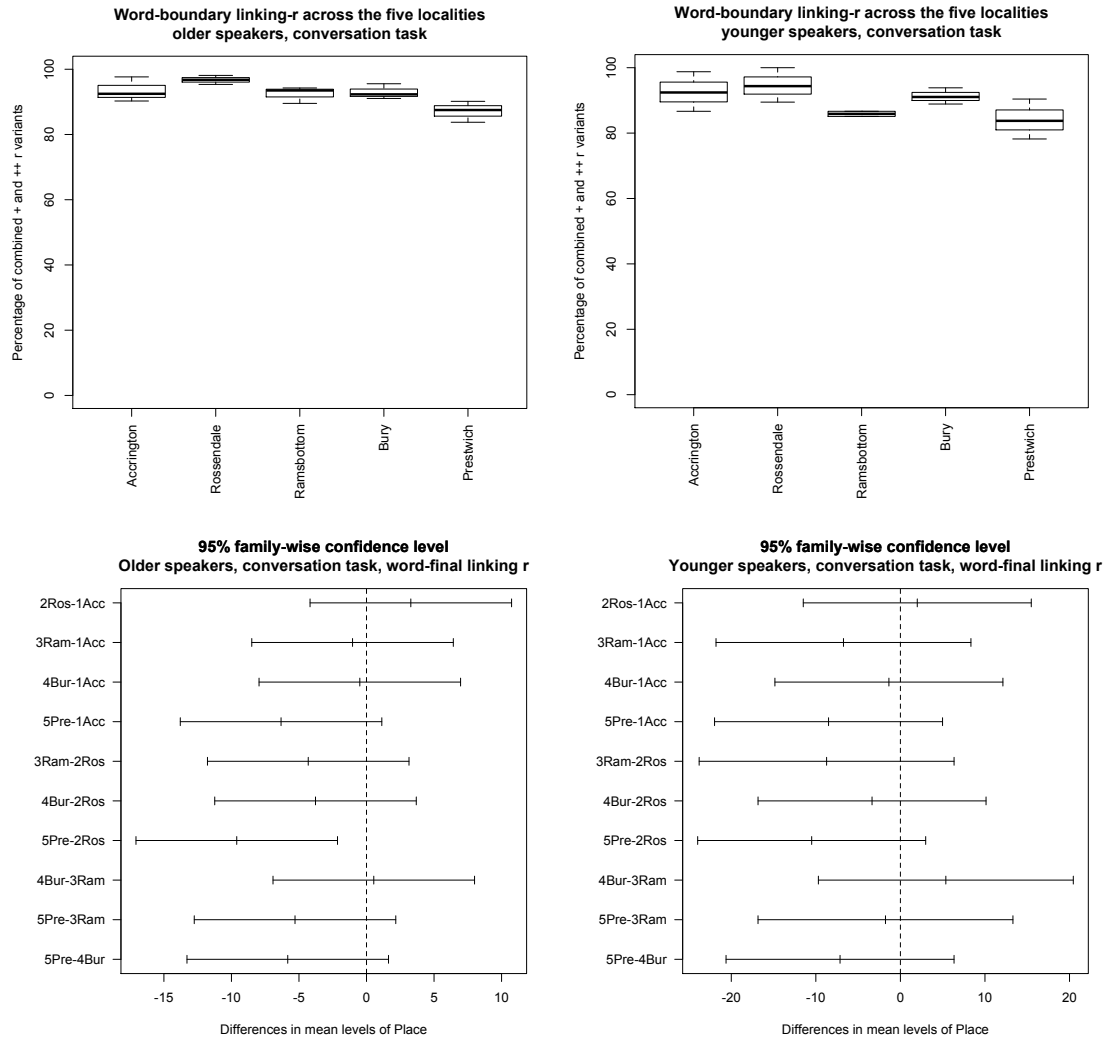


Figure 5.16
Conversation task. Apparent time variation in word-final linking-*r*; visualisation of Tukey's HSD test. For older speakers, word-boundary linking-*r* conversation task: ANOVA $F(4,10) = 4.66$, $p = 0.022$. Kruskal-Wallis rank-sum H(4) = 8.8, $p = 0.066$. Mean values: Acc 93.5%, Ros 96.7%, Ram 92.4%, Bur 93.0%, Pre 87.1%. For younger speakers, word-boundary linking-*r* conversation task: ANOVA $F(4,9) = 2.35$, $p = 0.132$. Kruskal-Wallis rank-sum H(4) = 6.95, $p = 0.139$. Table of means: Acc 92.6%, Ros 94.6%, Ram 85.9%, Bur 91.3%, Pre 84.1%

does seem to be quite variable for these speakers, particularly in the sentence-reading style. This variation matches Hay and Sudbury's observation that linking-*r* is 'a rather more variable phenomenon than most phonological accounts suggest' (2005: 817).

*5.5.4 Significance of difference in levels of word-final linking-*r *across different places*

Boxplots and Tukey's HSD tests on word-final linking-*r* in the conversation data for older and younger speakers are given in Figure 5.16.

For younger speakers there is no significant difference between populations. However, for older speakers the distribution of linking-*r* verges on significance: despite the apparent lack

of variation across the different places, there is some evidence that the speakers from different places belong to different populations (ANOVA p = 0.022, Kruskal-Wallis p = 0.066). The Tukey's HSD test suggests that there is a significant difference between older Rossendale speakers and older Prestwich speakers. If there is a link between level of rhoticity and level of linking-*r* then this would be expected, given the large difference in levels of rhoticity in Prestwich and Rossendale. However, the lack of significant differences between other pairs of places which also differ in levels of rhoticity, such as Accrington and Bury, or Rossendale and Bury, suggests that this link between level of rhoticity and level of linking-*r* does not apply consistently across the sample of speakers.

Boxplots and Tukey's HSD tests on word-final linking-*r* in the sentences data for older and younger speakers are given in Figure 5.17. Although the mean values for word-boundary linking-*r* in the sentences task show an interesting pattern of variation, and it is true that Rossendale speakers (who have the highest levels of rhoticity) have the highest rates of word-boundary linking-*r*, there are no statistical differences between speakers grouped by place. It is clear from the boxplots that the sentences task produces a much wider range of realisation of word-boundary linking-*r* than the conversation task. Again, this could be related to the careful speech style and potentially slower speech rate associated with a reading task.

5.6 Distribution of intrusive-*r* in East Lancashire

The overall figures for intrusive-*r* in the data are given in Table 5.11 and represented by the charts in Figure 5.18.

5.6.1 Lack of hyper-dialectal r

Hyper-dialectal or hyper-rhotic *r* is non-etymological *r* that can occur in non-sandhi environments, such as utterance finally or in coda consonant clusters. It is mentioned by Wells (1982) and Trudgill (1986) as a feature of traditionally rhotic dialects in contact with non-rhotic incoming varieties, for example in parts of the south west of England. It has also been reported in East Lancashire varieties by Vivian (2000) and Austin (2007). In my data, hyper-dialectal *r* is very rare: there are 12 tokens in the global dataset. Two are by Acc3: *Emma*[ɹ]*[PAUSE] 'll*; *window*[ɹ] *[PAUSE] open*. Both of these are in potentially intrusive contexts: it is the presence of a noticeable pause which made me label them hyperrhotic. Ros10 produced prepausal *yeah* [jɛːɹ]; she also produced a hyperrhotic pronunciation of *spa* with a following pause. Ros11

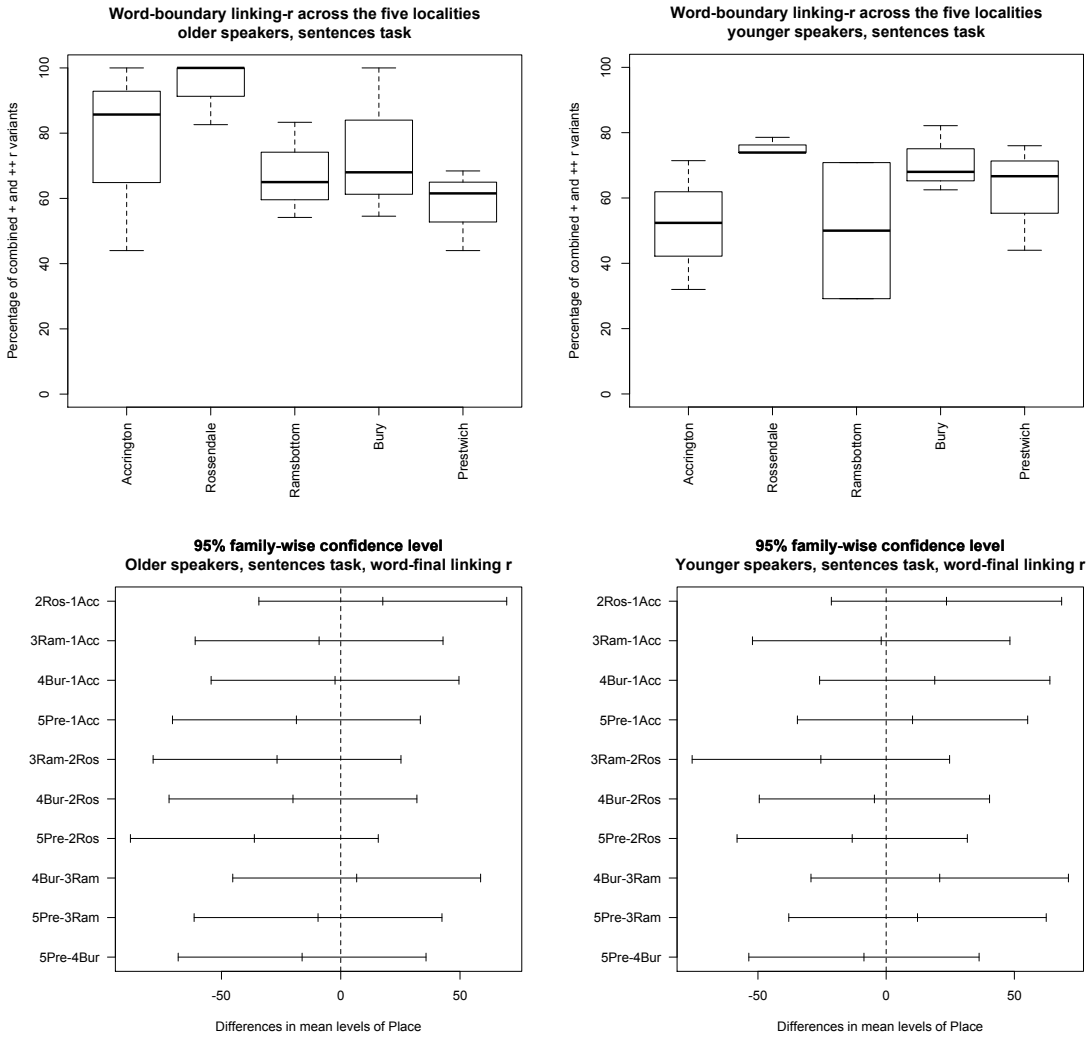


Figure 5.17
Sentences task. Apparent time variation in word-final linking-*r*; visualisation of Tukey's HSD test. For older speakers, word-boundary linking-*r* conversation task: ANOVA $F(4,10) = 1.43$, $p = 0.293$. Kruskal-Wallis rank-sum H(4) = 4.48, $p = 0.345$. Mean values: Acc 76.6%, Ros 94.2%, Ram 67.5%, Bur 74.2%, Pre 58.0%. For younger speakers, word-boundary linking-*r* conversation task: ANOVA $F(4,9) = 1.27$, $p = 0.349$. Kruskal-Wallis rank-sum H(4) = 4.91, $p = 0.297$. Table of means: Acc 51.9%, Ros 75.5%, Ram 50%, Bur 70.9%, Pre 62.2%

produced a hyperrhotic realisation of *Emma*[ɹ]*[PAUSE] 'll* similarly to Acc3's realisation, and as with Acc3, this could have been an anticipatory intrusive-*r* with the pause being a stumble as she read an unfamiliar sentence. Ros12 produced hyperrhotic *area* [ɛːɹɪəˠ] and *lager* [lɑˠːgəˠ]. Bur19 produced *grandma had* [gɹanmɑˠ had], which would have been in an intrusive context had she dropped the *h* on *had*: *h*-dropping was generally typical of her speech. Bur19 also produced hyperrhotic *r* in *Angela and*, *tuna always* and *India and*: in each case there was a pause between the two words, which would otherwise have formed an *r*-sandhi context. Pre26 produced *saw an* [sɔːɹ ən] again with a noticeable pause between the words. The sporadic incidence of these examples of hyperrhoticity is clear.

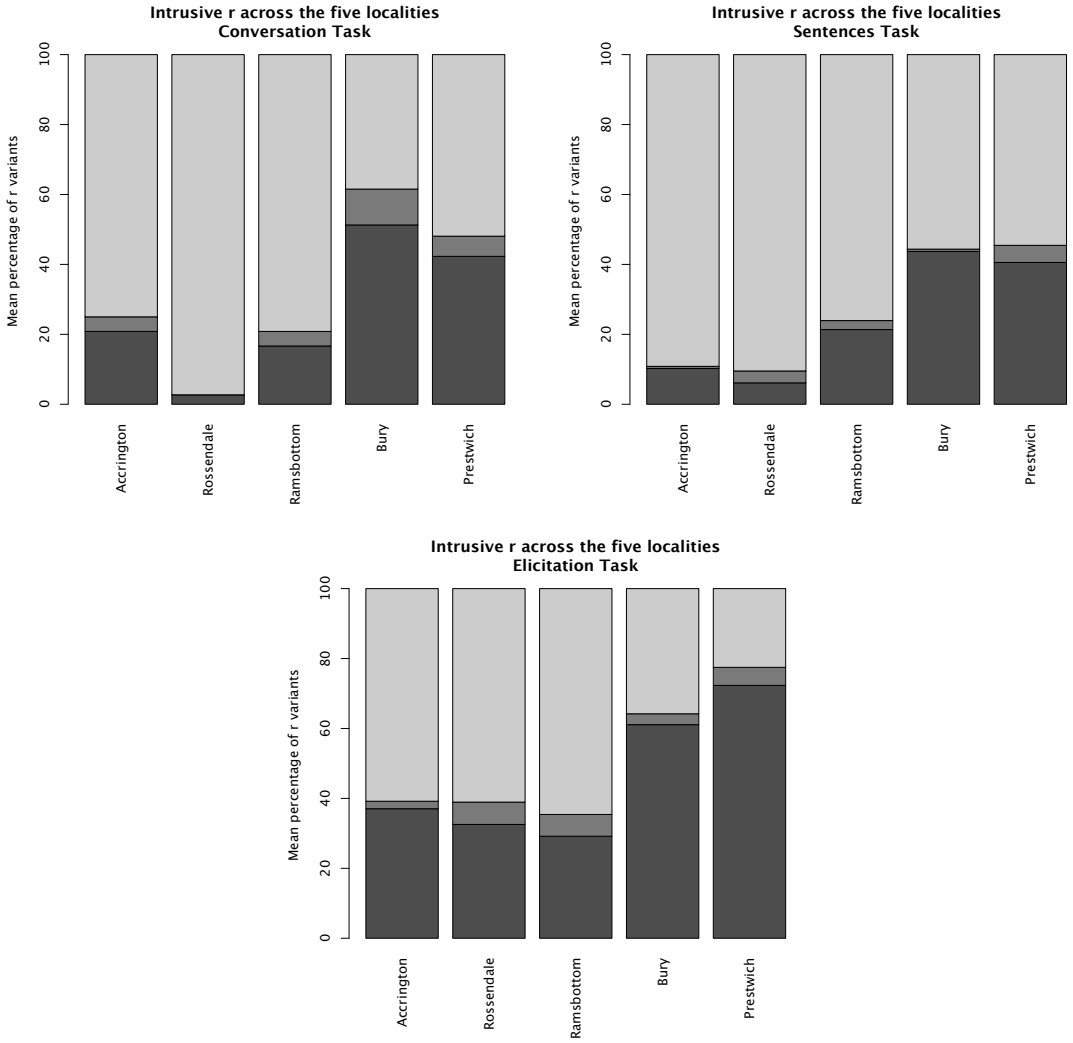


Figure 5.18
Intrusive-*r* across all localities and all speakers in the the three tasks.

*5.6.2 Overall patterns in the data for intrusive-*r

The distributional statistics for intrusive-*r* indicate clear differences across different locations and in the different task styles. The spontaneous speech generated by the conversation task shows the greatest range in levels of intrusive-*r* across the different places, with Rossendale speakers producing 3% intrusive-*r*, while Bury speakers produce 62% intrusive-*r*. The sentences task produces speech which tends towards slightly lower levels of intrusive-*r*, which would be consistent with a 'careful' speech style. However, there are individual differences between places: Accrington speakers produce less intrusive-*r* in the sentences task than the conversation task, but Rossendale and Ramsbottom speakers actually produce more intrusive-*r* in the sentences task. If there is style-shifting in production of intrusive-*r*, then not all speakers shift away from

	Accrington	Rossendale	Ramsbottom	Bury	Prestwich
Conversation					
–	36	36	19	15	27
+	2	0	1	4	3
++	10	1	4	20	22
Total	48	37	24	39	52
Sentences					
–	148	133	89	84	78
+	1	5	3	1	7
++	17	9	25	66	58
Total	166	147	117	151	143
Elicitation					
–	284	287	259	184	109
+	10	30	25	16	25
++	173	153	117	314	350
Total	467	470	401	514	484

Table 5.11
Raw figures for intrusive-*r* in the three tasks

intrusive-*r* in careful reading-style speech (cf. Foulkes 1997). The elicitation task produces an across-the-board increase in levels of intrusive-*r*. As predicted by the initial multivariate analysis of the overall data, task style is clearly influential in the production of intrusive-*r*.

The overall distribution of intrusive-*r* is very different from that of linking-*r*. There is much more variation between tasks and between groups of speakers from different places. When compared to the distribution of rhoticity, the variation across places is similar, although inverted: Accrington and Rossendale, which have the highest levels of rhoticity, have the lowest levels of intrusive-*r*; Bury and Prestwich, which have the lowest levels of rhoticity, have the highest levels of intrusive-*r*. This potential correlation between rhoticity and intrusive-*r* will be discussed in Section 5.7: it matches the New Zealand archive results: '[t]he less rhotic the speakers are, the more likely they are to display intrusive /r/ ... [i]ntrusive /r/ increases as rhoticity declines' (Hay & Sudbury 2005: 813). However, while levels of rhoticity do not vary significantly across the different task styles, there is a variation in levels of intrusive-*r*; this will be discussed in terms of the nature of the tasks, especially the elicitation task, in Section 5.7.5.

The ceiling for intrusive-*r* in the overall data is 77% (Prestwich speakers, elicitation task), with most results being far lower. This upper limit casts interesting light on the variable occurrence of intrusive-*r*: even speakers who are almost categorically non-rhotic fail to produce intrusive-*r* in all possible tokens.

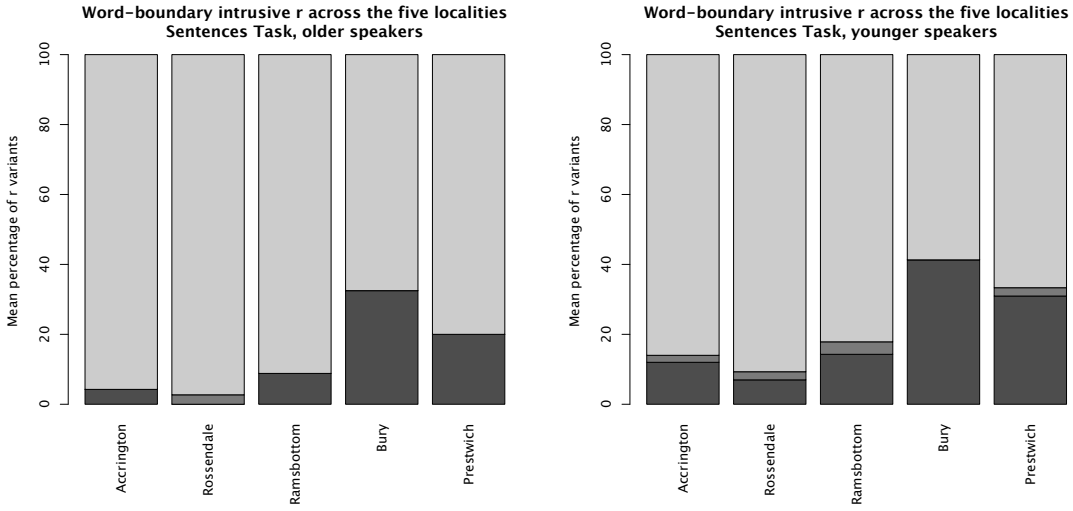


Figure 5.19
Apparent time variation in word-boundary intrusive-*r*, sentences task.

	Accrington	Rossendale	Ramsbottom	Bury	Prestwich
Older					
–	45	36	31	27	28
+	0	1	0	0	0
++	2	0	3	13	7
Total	47	37	34	40	35
Younger					
–	43	39	23	27	28
+	1	1	1	0	1
++	6	3	4	19	13
Total	50	43	28	46	42

Table 5.12
Raw figures for word-boundary intrusive-*r* in the sentences task: older and younger speakers

As was the case with rhoticity and linking-*r*, a further break-down of the results to take speaker age into account reveals further variation in the data. However, because the numbers of tokens of intrusive-*r* in the conversation task data are small, as shown in Table 5.11, I will use the sentences and elicitation data for this apparent time analysis.

*5.6.3 Apparent time analysis of change in distribution of intrusive-*r

Word-boundary and word-internal intrusive-*r* may pattern slightly differently, so this apparent time analysis treats each morphological category separately. The data for realisation of word-boundary intrusive-*r* in the two age groups in the sentences task are given in Figure 5.19 and Table 5.12. The charts for younger and older speakers show a very similar pattern of relative differences in the levels of intrusive *r* in the different localities: Rossendale speakers in both age

	Accrington	Rossendale	Ramsbottom	Bury	Prestwich
Older					
–	29	30	26	14	15
+	0	0	0	0	3
++	4	1	3	17	10
Total	33	31	29	31	28
Younger					
–	26	25	8	15	7
+	0	2	2	1	3
++	5	5	12	13	24
Total	31	32	22	29	34

Table 5.13
Raw figures for word-internal intrusive-*r* in the sentences task: older and younger speakers

groups are least likely to produce intrusive-*r*; Bury speakers (followed by Prestwich speakers) are most likely. There seems to be an across-the-board increase, such that younger speakers in each locality are more likely to produce intrusive-*r* than are the older speakers in the same place.

While the results for both age groups of Rossendale speakers seem to conform to the expected pattern in which most rhoticity matches least *r* intrusion, the younger speakers seem to have increased their rate of *r* production in both coda and intrusive contexts. It could suggest that being *r*-ful is somehow coming to be associated with Rossendale speakers, but that this new higher level of *r* production does not consistently map onto existing phonological systems: more realised *r*s seem to be preferred regardless of whether older speakers would have had an *r* in that position (coda contexts) or not (intrusive contexts). This idea would have to entail a restructuring of how speakers manage their phonological systems; it is not quite the same as the system of hyperrhoticity which Vivian (2000) observes in Accrington and Burnley, and which is also found in the South West of England. The Rossendale speakers are already robustly rhotic, in that they produce high levels of surface *r* in coda positions, and have grown up in a rhotic speech community. But in becoming 'more rhotic' (in the sense of producing even higher levels of coda-*r*), they end up producing *r* in intrusive contexts. However, they do not produce hyperrhotic *r* in non-sandhi contexts in any systematic way. These sporadic cases of apparent hyperrhoticity can be attributed to one-off occurrences, rather than reflecting a regular feature of these speakers' phonological systems.

The results for word-internal intrusive-*r* in the sentences task are given in Figure 5.20 and Table 5.13. These results show higher levels of word-internal intrusive-*r* for younger speakers than older speakers.

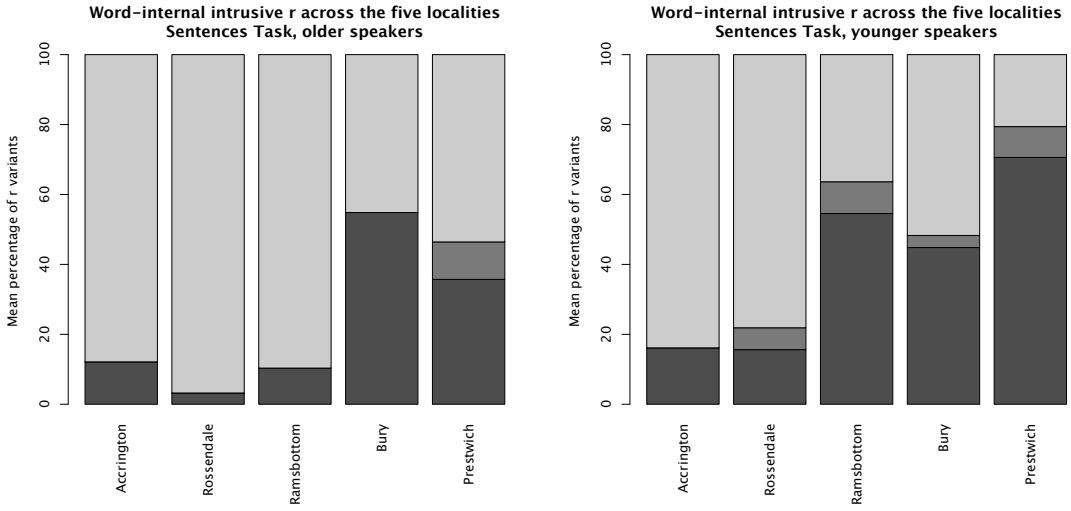


Figure 5.20
Apparent time variation in word-internal intrusive-*r*, sentences task.

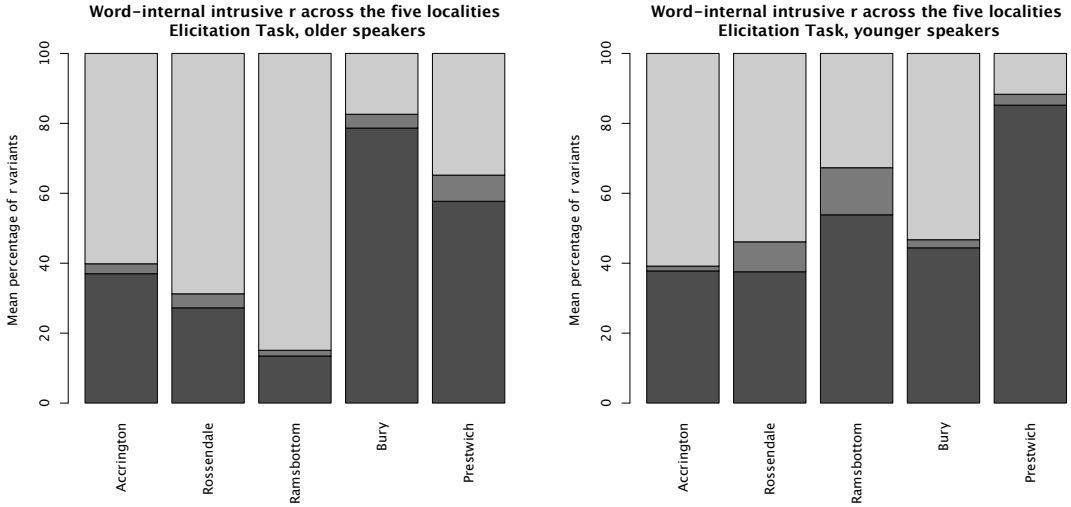


Figure 5.21
Word-internal intrusive-*r* across localities: elicitation task, old and young speakers.

The figures for word-internal intrusive-*r* for older and younger speakers in the elicitation task are as shown in Figure 5.21 and Table 5.14. A potential issue with collating data from the elicitation task is that some speakers altered the pronunciation of certain potentially intrusive contexts in such a way as to render the context no longer a potential site for *r* intrusion. For example, some speakers realised *Locka* + *y* as [lɒkeː], possibly because the presence of a morpheme boundary was trumped in their processing of the written stimulus by the fact that ⟨ay⟩ often encodes /e/ in English orthography. Other examples of a change to the environment of potential intrusion include the elision of final schwas, such that *Locka* + *y* is pronounced [lɒkɪ],

	Accrington	Rossendale	Ramsbottom	Bury	Prestwich
Older					
–	148	154	208	44	79
+	7	9	4	10	17
++	91	61	33	199	131
Total	246	224	245	253	227
Younger					
–	132	132	51	138	30
+	3	21	21	6	8
++	82	92	84	115	219
Total	217	245	156	259	257

Table 5.14
Raw figures for word-internal intrusive-*r* in the elicitation task: older and younger speakers

	Accrington	Rossendale	Ramsbottom	Bury	Prestwich
Older					
–	168	218	257	66	123
+	8	10	4	13	18
++	91	61	33	199	131
Total	267	289	294	278	272
Younger					
–	184	165	91	156	54
+	3	23	21	6	9
++	82	92	84	115	219
Total	269	280	196	277	282

Table 5.15
Raw figures for word-internal intrusive-*r* in the elicitation task: older and younger speakers

or *Gretna + y* is pronounced [gɹɛʔnɪ]. There are two ways of dealing with these examples. They can be removed from the dataset using the argument that the question of *r*-intrusion simply does not arise in these cases. That is the approach I have taken in the presentation of the data: these tokens were coded 'Context = None' rather than 'Context = Intrusive'. However, these examples could be regarded as instances of an avoidance of intrusive-*r*. If speakers use a glottal stop or some form of glide transition rather than *r*, or if they elide the final schwa in the base, they are effectively using different strategies to achieve the same thing: avoiding having to intrude *r*. Taking this approach, the 'Context = None' tokens should be included in the intrusive-*r* data: effectively, this analysis increases the proportion of intrusive-*r* tokens coded – (i.e. where *r* is not produced).

The figures for intrusive-*r* and 'none' for older and younger speakers are as shown in Figure 5.22 and Table 5.15. Of 2763 potentially intrusive tokens (given the orthographic stimuli), 2329 were coded 'Intrusive' and 375 were coded 'None' for the reasons just explained.

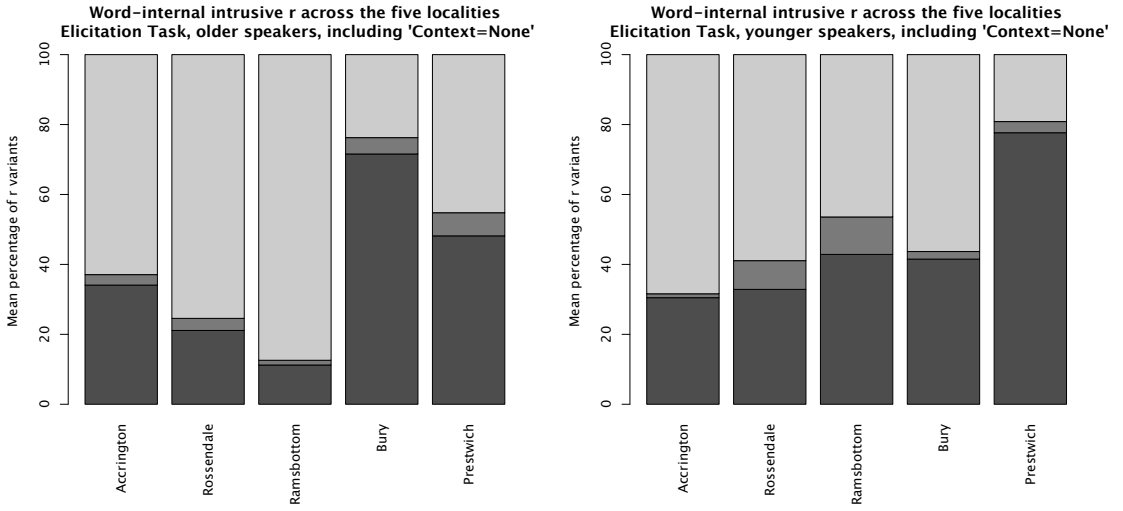


Figure 5.22
Word-internal intrusive-*r* and 'None' across localities: elicitation task, older and younger speakers.

The remaining 59 tokens were coded 'None-linking' because they resulted from effectively restructuring the environment to become a linking context (consistently leading to a ++ realisation of *r*). All of these tokens involved the base *Middlesbrough* /mɪdəlzbrə/ or /mɪdəlzbərə/, which when combined with a suffix such as *–ish* was sometimes pronounced as /mɪdəlzbərɪʃ/ or /mɪdəlzbrɪʃ/. Such a restructuring avoids a hiatus, but the *r* that is present is quite possibly the same *r* that is present in the original base, rather than being the result of an intrusive-*r* process. These 51 tokens are therefore not included in the results in Figure 5.22.

Predictably, given the comparatively small token counts for 'Context = None' compared to 'Context = Intrusive', adding on the 'Context = None' tokens does not radically alter the distribution of intrusive-*r* across the five localities: there is little difference between Figures 5.21 and 5.22, although Figure 5.22 indicates slightly lower overall levels of intrusive-*r* because the 'Context = None' tokens increase the count of – coded tokens. Although it is important to investigate potential task-related effects such as the variable realisation of *Locka* + *y*, in this case there is not a large difference in the results, so I will focus on the unambiguous tokens of intrusive-*r* in the subsequent discussion.

The figures for both groups of speakers are somewhat surprising. First I will discuss the data for older speakers. If levels of intrusive-*r* correlate negatively with levels of rhoticity, it would be predicted that Accrington speakers, who have the highest level of rhoticity, should have the lowest level of intrusive-*r*. In fact, as the left panel of Figure 5.21 shows, older Accrington speakers have quite a high level of intrusive-*r*: 40%. Furthermore, the speakers in

Rossendale and Ramsbottom show a gradual reduction in levels of intrusive-*r*, which is in the same direction as the reduction of levels of coda-*r* for the same set of speakers, as shown in the left panel of Figure 5.7. The older speakers in Accrington, Rossendale and Ramsbottom seem to have the same system, in which levels of *r* appear to vary in a grouped manner: the Ramsbottom speakers, for instance, have low levels of *r* across the board, whether these are in a coda position or a potentially intrusive position. This tendency appears to be a mirror-image of the tendency for Rossendale speakers to have high levels of *r* in both coda and intrusive contexts, and both of these could be linked to closeness to a dialect boundary. Rossendale speakers are on the rhotic side of an isogloss; Ramsbottom speakers are on the non-rhotic side of the same isogloss. As will be discussed in Chapter 6, perhaps both groups of speakers have an interest in emphasising their *r*-less or *r*-ful status, even to the extent of overcompensating in their production or non-production of surface *r*.

The older speakers in Bury and Prestwich have a different system: they have a much higher level of intrusive-*r*, and this corresponds to lower levels of coda-*r*. In broad terms then, the Bury and Prestwich speakers conform to the expected pattern of rhoticity and intrusive-*r*. However, even here the relationship is not straightforward: again, there seems to be an effect where lower levels of coda-*r* are linked to lower levels of intrusive-*r*. Prestwich speakers have lower levels of coda-*r* than do Bury speakers, and also have lower levels of intrusive-*r*. This difference could be evidence of an effect in the task itself, whereby there is some overall propensity to produce *r* or not to produce *r*, regardless of phonological context. This task-related effect could be superimposed on an underlying difference in which Accrington, Rossendale and Ramsbottom speakers have one system, and Bury and Prestwich speakers have a different system. The Accrington, Rossendale and Ramsbottom speakers produce intrusive-*r* despite also regularly producing coda-*r*; the Bury and Prestwich speakers produce high levels of intrusive-*r* because they have very low levels of coda-*r* (the idea of causality is not taken directly from this task's data, but is expected from the vast majority of accounts of the development of intrusive-*r*).

The younger speakers seem to have a different distribution of intrusive-*r*. The Prestwich young speakers, who have the lowest level of coda-*r*, have the highest level of intrusive-*r*, which is expected. Indeed, they produce intrusive-*r* (either + or ++) 88% of the time. The remaining four localities suggest a gradual reduction in levels of intrusive-*r* between Bury and Accrington, with a spike in Ramsbottom representing a higher rate of intrusive-*r* production in that locality.

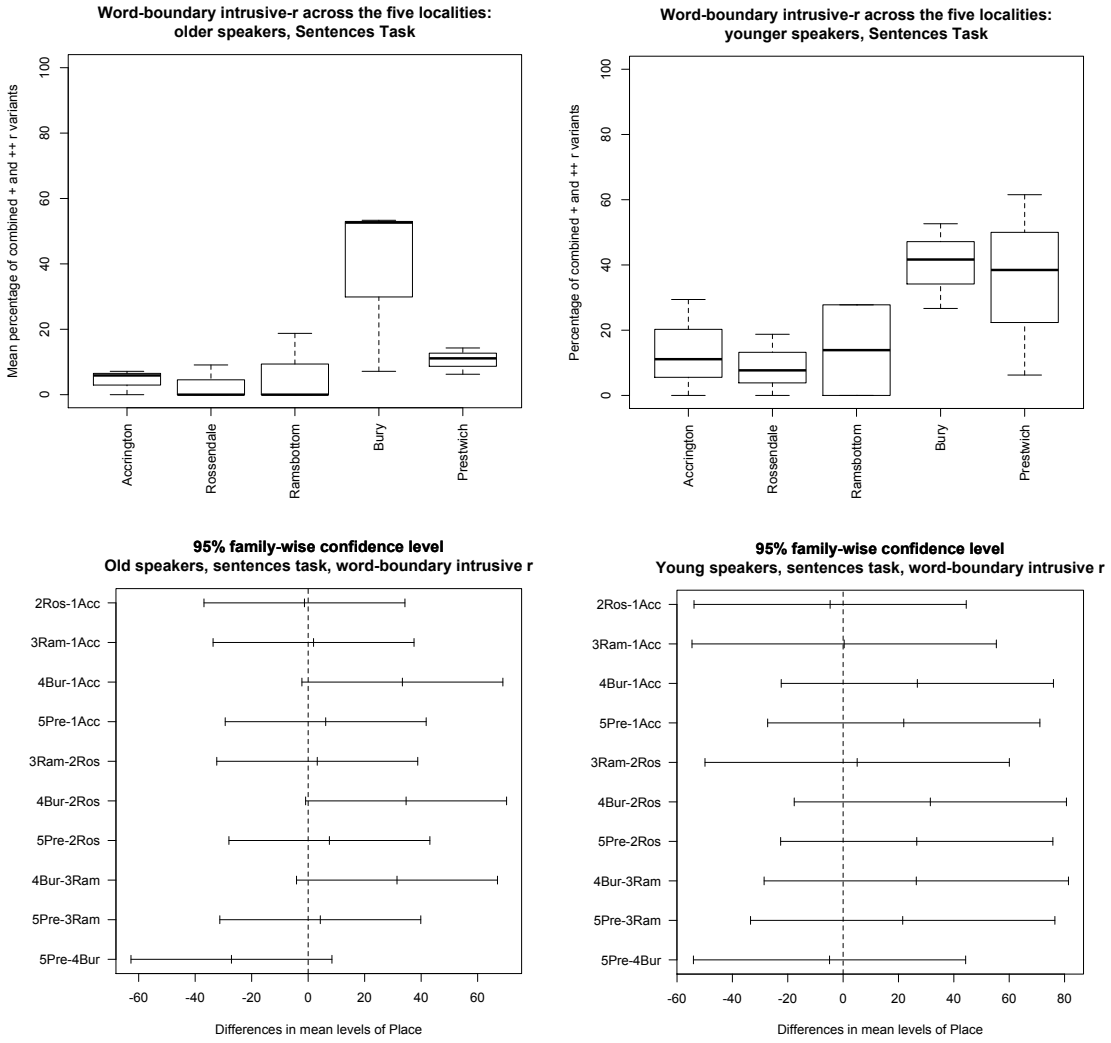


Figure 5.23
Sentences task. Apparent time variation in word-final intrusive-*r*; visualisation of Tukey's HSD test. For older speakers, word-boundary intrusive-*r* sentences task: ANOVA $F(4,10) = 3.57$, $p = 0.047$. Kruskal-Wallis rank-sum H(4) = 6.05, $p = 0.195$. Mean values: Acc 4.3%, Ros 3.0%, Ram 6.2% , Bur 37.7%, Pre 10.5%. For younger speakers, word-boundary intrusive-*r* sentences task: ANOVA $F(4,9) = 1.87$, $p = 0.199$. Kruskal-Wallis rank-sum H(4) = 5.17, $p = 0.27$. Mean values: Acc 13.5%, Ros 8.81%, Ram 13.9%, Bur 40.3%, Pre 35.4%.

This does not correspond to the distribution of rhoticity for younger speakers, as given in the right panel of Figure 5.7. Specifically, given the spike in rhoticity which marked young Rossendale speakers as different from their neighbours in both Ramsbottom and Accrington, I would expect a related pattern in the intrusive-*r* data, such as a marked dip in rates of intrusive-*r* for young Rossendale speakers.

*5.6.4 Significance of difference in levels of intrusive-*r *across different places*

Boxplots and Tukey's HSD tests on word-final intrusive-*r* in the sentences data for older and younger speakers are given in Figure 5.23. Although the distribution of word-boundary

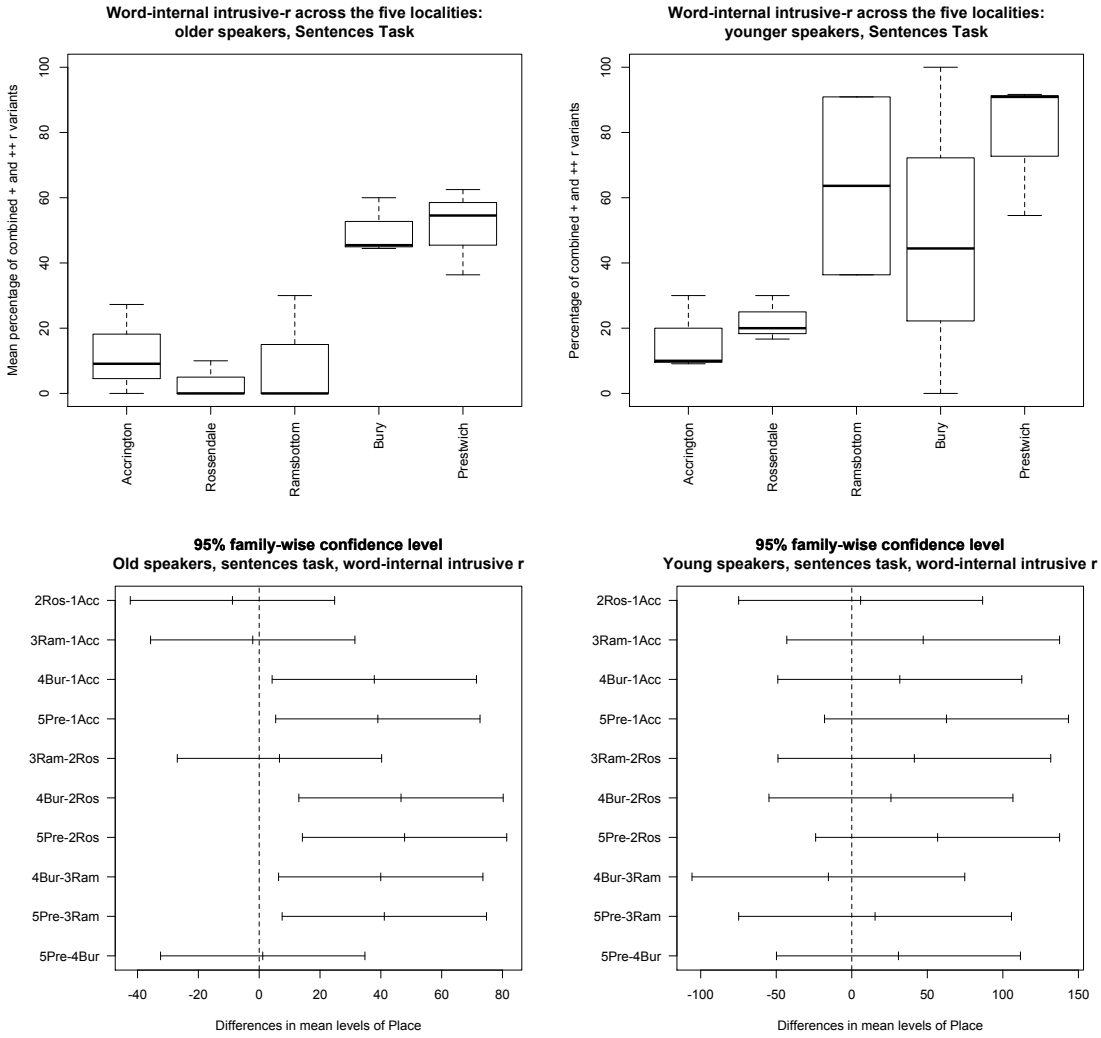


Figure 5.24
Sentences task. Apparent time variation in word-final intrusive-*r*; visualisation of Tukey's HSD test. For older speakers, word-boundary intrusive-*r* sentences task: ANOVA $F(4,10) = 10.39$, $p = 0.001$. Kruskal-Wallis rank-sum H(4) = 10.65, $p = 0.031$. Mean values: Acc 12.1%, Ros 3.3%, Ram 10.0%, Bur 50.0%, Pre 51.1%. For younger speakers, word-boundary intrusive-*r* sentences task: ANOVA $F(4,9) = 2.37$, $p = 0.129$. Kruskal-Wallis rank-sum H(4) = 6.63, $p = 0.157$. Mean values: Acc 16.4%, Ros 22.2%, Ram 63.6%, Bur 48.1%, Pre 79%.

intrusive-*r* suggests a trend towards higher levels of intrusive-*r* in Bury and Prestwich than in Accrington, Rossendale and Ramsbottom, the differences between places are not statistically significant for older or younger speakers.

Boxplots and Tukey's HSD tests on word-internal intrusive-*r* in the sentences data for older and younger speakers are given in Figure 5.24. Although the distribution of word-boundary intrusive-*r* suggests a trend towards higher levels of intrusive-*r* in Bury and Prestwich than in Accrington, Rossendale and Ramsbottom, the differences between places are not statistically significant for younger speakers. Older speakers, however, do statistically differ across places

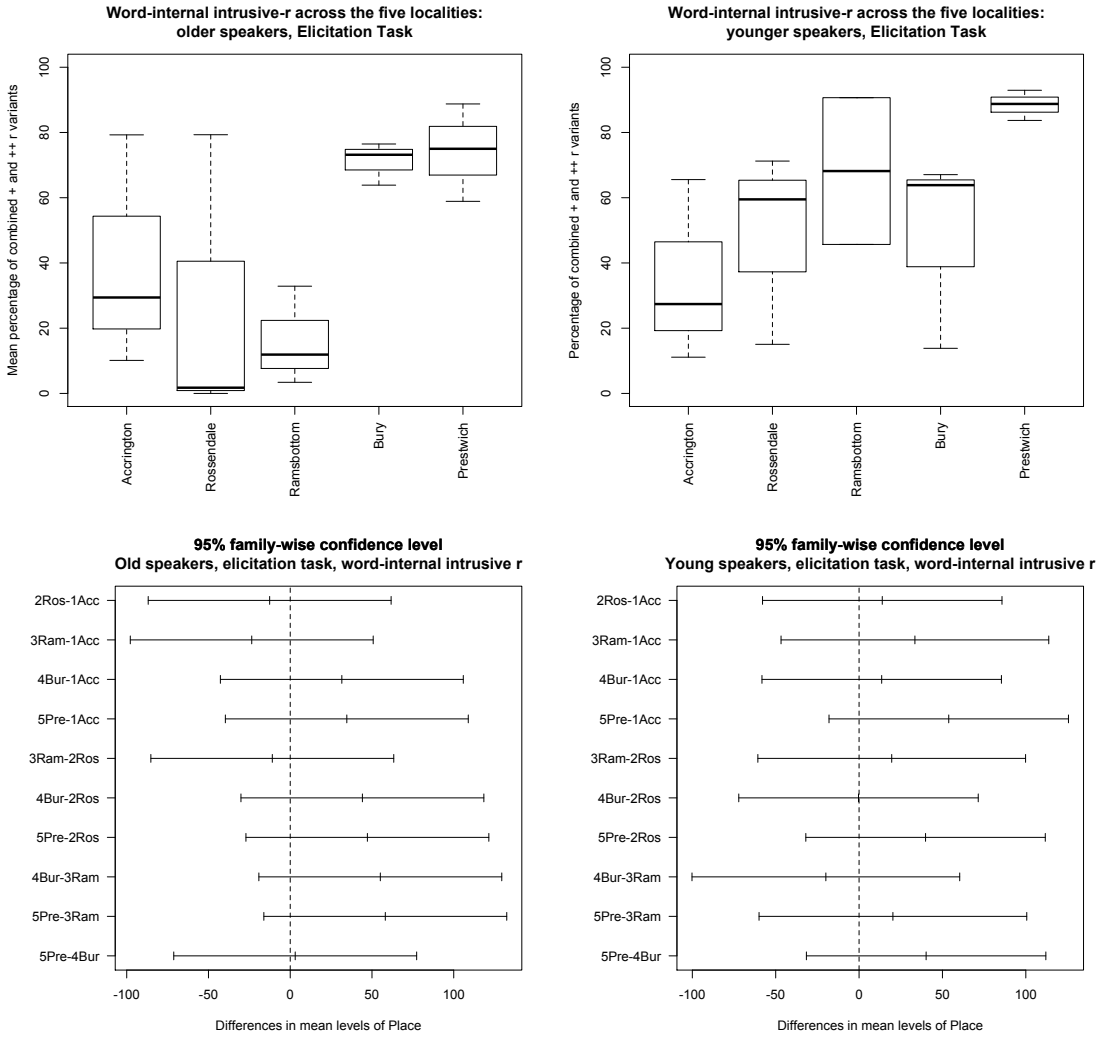


Figure 5.25
Elicitation task. Apparent time variation in word-final intrusive-*r*; visualisation of Tukey's HSD test. For older speakers, word-boundary intrusive-*r* sentences task: ANOVA $F(4,10) = 2.68$, $p = 0.094$. Kruskal-Wallis rank-sum H(4) = 4.67, $p = 0.323$. Mean values: Acc 39.6%, Ros 27.0%, Ram 16.1% , Bur 71.2%, Pre 74.2%. For younger speakers, word-boundary intrusive-*r* sentences task: ANOVA $F(4,9) = 1.88$, $p = 0.198$. Kruskal-Wallis rank-sum H(4) = 6.6, $p = 0.159$. Mean values: Acc 34.7%, Ros 48.6%, Ram 68.2%, Bur 48.3%, Pre 88.5%.

with respect to levels of word-internal intrusive-*r* ($p = 0.03$). There is a clear split between Bury/Prestwich and Ramsbottom/Rossendale/Accrington.

Boxplots and Tukey's HSD tests on word-internal intrusive-*r* in the elicitation task data for older and younger speakers are given in Figure 5.25. Significance testing of the data in Figure 5.25 reveals that word-internal intrusive-*r* does not vary significantly with regard to locality for either the older or the younger speakers in the elicitation task. However, the boxplots reveal a large amount of variation within several sample cells: older Accrington and Rossendale speakers and younger Accrington, Rossendale, Ramsbottom and Bury speakers all have a wide range of levels of word-internal intrusive-*r*. There is a task-related effect here: the same older Accrington

and Rossendale speakers produce much more homogeneous results for word-internal intrusive-*r* in the sentences task. The same difference applies to younger Accrington and Rossendale speakers. Given that speakers from Accrington and Rossendale had the highest levels of rhoticity in the survey, the standard account of the relationship between rhoticity and intrusive-*r* would predict that they should have the lowest levels of intrusive-*r*. Clearly, some speakers produce unexpectedly high levels of intrusive-*r* in the elicitation task, and this may reflect the nature of the task itself, with its highly repetitive structure. In Section 5.7.5 I discuss one possibility: that there could be a 'priming' effect such that the repetition of similar but not identical contexts may cause speakers to settle on intrusive-*r* as a hiatus-filling strategy during the course of the task.

5.7 Does *r*-sandhi correlate with rhoticity?

5.7.1 Relevant data from the different tasks

The conversational data for each speaker contains 300 tokens of coda-*r*, each of which is coded according to its realisation as –, + or ++. Each recording is approximately an hour long, but generally the 300 token limit was reached after approximately 25 to 35 minutes of speech. Tokens of *r* sandhi are much less frequent, so every token of linking or intrusive-*r* in each recording was coded. The mean number of tokens of linking-*r* per speaker in the conversational data is 89; the mean number of intrusive-*r* tokens is 6.9. Given these low token counts for *r*-sandhi, and particularly the very low number of tokens of intrusive-*r*, when testing for correlation with rhoticity, I focus on data from the two non-spontaneous speech tasks: the sentences task and the elicitation task. There are differences between some speakers' production of linking and intrusive-*r* across the two tasks, so I will present the data from each task separately. Table 5.16 shows the percentages of realised coda-*r*, linking-*r* and intrusive-*r* in the sentences task data for each speaker; here 'realised *r*' is the combined total of + and ++ tokens. The overall figures for *r*-sandhi are given as well as figures broken down by morphological context: word-final and word-internal. Table 5.17 shows the percentages of realised coda-*r*, linking-*r* and intrusive-*r* in the elictation task data. By its nature, the elicitation task produces word-internal sandhi tokens.

The percentages in Tables 5.16 and 5.17 provide the data for the correlation tests below.

*5.7.2 Rhoticity and linking-*r

Hay & Sudbury (2005) found positive correlations between speakers' level of rhoticity and their level of linking-*r* production, and indeed, this is one of the key points of their answer to the

Sentences Task	Coda-*r*	Linking-*r*			Intrusive-*r*		
Speaker Number		All contexts	Word-final	Word-internal	All contexts	Word-final	Word-internal
1Acc	52.1	88.9	85.7	93.3	0.0	0.0	0.0
2Acc	55.6	65.0	44.0	100.0	14.3	5.9	27.3
3Acc	73.8	100.0	100.0	100.0	8.0	7.1	9.1
4Acc	34.2	72.2	52.4	100.0	10.3	11.1	9.1
5Acc	16.2	53.7	32.0	87.5	4.0	0.0	10.0
6Acc	11.3	83.8	71.4	100.0	29.6	29.4	30.0
7Ros	28.2	89.5	82.6	100.0	0.0	0.0	0.0
8Ros	66.7	100.0	100.0	100.0	9.5	9.1	10.0
9Ros	47.4	100.0	100.0	100.0	0.0	0.0	0.0
10Ros	32.9	84.2	73.9	100.0	19.2	18.8	20.0
11Ros	68.3	89.7	78.6	100.0	17.4	7.7	30.0
12Ros	66.7	84.2	73.9	100.0	7.7	0.0	16.7
13Ram	12.7	71.8	54.2	100.0	0.0	0.0	0.0
14Ram	51.3	80.0	65.0	100.0	0.0	0.0	0.0
15Ram	1.4	89.5	83.3	100.0	23.1	18.8	30.0
16Ram	1.4	82.1	70.8	100.0	51.7	27.8	90.9
17Ram	1.4	55.3	29.2	100.0	19.0	0.0	36.4
19Bur	17.1	91.9	86.4	100.0	47.6	36.4	60.0
20Bur	4.5	100.0	100.0	100.0	56.0	53.3	60.0
21Bur	6.9	73.0	54.5	100.0	24.0	7.1	45.5
22Bur	0.0	80.0	68.0	100.0	50.0	52.6	44.4
23Bur	1.5	88.4	82.1	100.0	16.0	26.7	0.0
24Bur	3.0	77.5	62.5	100.0	68.2	41.7	100.0
25Pre	2.8	75.6	61.5	100.0	38.1	33.3	44.4
26Pre	1.3	81.8	68.4	100.0	35.3	11.1	62.5
27Pre	2.9	75.6	61.5	100.0	24.0	14.3	36.4
28Pre	0.0	62.5	44.0	93.3	25.9	6.3	54.5
29Pre	0.0	85.0	76.0	100.0	76.0	61.5	91.7
30Pre	0.0	79.5	66.7	100.0	62.5	38.5	90.9

Table 5.16
Percentages of rhoticity, linking-*r* and intrusive-*r* in the sentences task.

question raised by the title of their paper: 'How rhoticity became /ɹ/ sandhi'. However, the East Lancashire data do not produce significant correlations between level of rhoticity and level of linking-*r*. As explained in my earlier discussion of the distribution of tokens of *r*-sandhi, I counted the sites of potential instances of *r*-sandhi (the same approach taken by Hay & Sudbury 2005). In the case of linking-*r*, this method raises the issue of identical surface realisations potentially having different motivations: non-rhotic speakers may have an active sandhi process leading to the realisation of surface *r*, whereas rhotic speakers would realise surface *r* in any case, and resyllabification rather than sandhi would apply. In theory then, speakers at both ends of the rhotic/non-rhotic scale would be expected to produce surface *r* in linking positions. If Hay and Sudbury are right, then speakers with variable levels of rhoticity (from populations where rhoticity is in the process of being lost) would be expected to realise variable levels of surface *r* in linking positions (with lower levels of coda-*r* corresponding to lower levels of linking-*r*). In fact, in the East Lancashire data there are not significant correlations between rates of rhoticity and rates of linking-*r*.

Elicitation Task Speaker Number	Coda-*r*	Word-internal Linking-*r*	Word-internal Intrusive-*r*
1Acc	57.3	100.0	10.1
2Acc	46.2	100.0	79.3
3Acc	76.8	97.6	29.4
4Acc	50.0	98.8	27.4
5Acc	19.7	96.9	11.1
6Acc	8.0	100.0	65.6
7Ros	30.4	100.0	0.0
8Ros	76.9	100.0	79.3
9Ros	46.2	98.8	1.8
10Ros	47.3	91.7	59.5
11Ros	67.4	95.9	71.2
12Ros	91.1	100.0	15.1
13Ram	41.1	98.8	11.9
14Ram	44.2	92.4	3.4
15Ram	6.9	100.0	32.9
16Ram	6.7	100.0	90.7
17Ram	2.2	97.5	45.7
19Bur	6.8	100.0	97.7
20Bur	8.8	98.8	73.2
21Bur	4.8	97.6	76.5
22Bur	1.1	100.0	63.9
23Bur	3.3	98.8	13.8
24Bur	2.3	90.6	67.1
25Pre	2.2	86.3	63.8
26Pre	2.3	90.3	75.0
27Pre	2.3	100.0	58.9
28Pre	3.4	100.0	88.8
29Pre	0.0	98.8	83.7
30Pre	0.0	100.0	92.9

Table 5.17
Percentages of rhoticity, linking-*r* and intrusive-*r* in the elicitation task.

*5.7.2.1 Sentences task: non-correlation between rhoticity and linking-*r

In order to explore more closely how individual speakers vary in terms of rhoticity and linking-*r*, the figures for each speaker's levels of rhoticity and linking-*r* in the sentences task were plotted against each other in Figure 5.26.

The results of a nonparametric test for correlation border on being significant at the 0.05 level. The Spearman's correlation is affected by ties when rankings of results are calculated: in this case four speakers realised every potential token of linking-*r* (resulting in a score of 100% for linking-*r*), and four different speakers had no realised tokens of coda-*r* (resulting in a score of 0% coda-*r*). In order to carry out the test for correlation, small amounts of statistical noise were added to the figures using the JITTER function in R (see Baayen 2008: 79). Following Hay & Sudbury (2005: 806), this test was carried out ten times, and the weakest correlation is reported. This procedure is used for all subsequent correlation tests where there are ties in the data. In the data for sentences task linking-*r* in Figure 5.26, although one of the runs produced a correlation where Spearman's rho = 0.38, $p = 0.046$, the rest of the runs produced results which were not

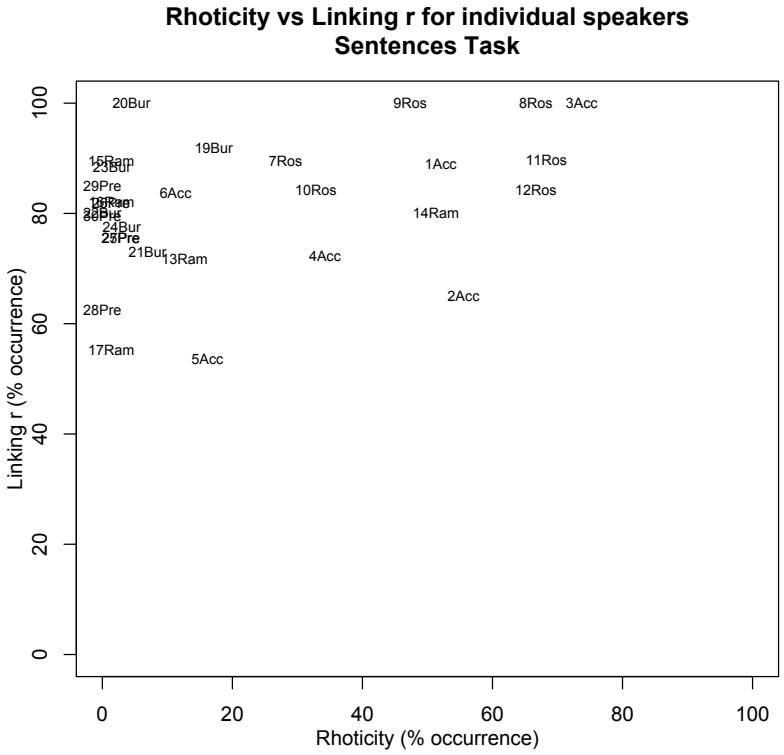


Figure 5.26
Linking-*r* vs rhoticity for individual speakers, sentences task. Spearman's rho = 0.35, p = 0.063.

below the 0.05 threshold. Furthermore, given the practice of reporting the weakest correlation, a result of Spearman's rho = 0.35, p = 0.063 is obtained. So, although these results may well be indicative of a potential correlation, which would match Hay and Sudbury's findings in New Zealand, the data do not allow me to claim statistical significance for such a correlation.

The Bury and Prestwich speakers all have very low levels of rhoticity but their levels of linking-*r* are clustered around 70 to 80%. The Accrington and Rossendale speakers have a wider range of levels of rhoticity; however, the levels of linking-*r* are limited in the range they cover: no speaker has less than 50% linking-*r*. Restricting the set of speakers to include only Accrington and Rossendale speakers produces the scatterplot in Figure 5.27. This scatterplot appears to show more of a correlation between rhoticity and linking-*r*, so that the less rhotic the speaker, the fewer tokens of linking-*r* are realised. However, in this case too the correlation only approaches the 0.05 significance threshold: although one run of the correlation test produced Spearman's rho = 0.62, p = 0.037, the lowest correlation was Spearman's rho = 0.51, p = 0.093. Given the lack of significant correlation between rhoticity and overall levels of linking-*r*, the next step is to consider word-final and word-internal tokens of linking-*r* separately.

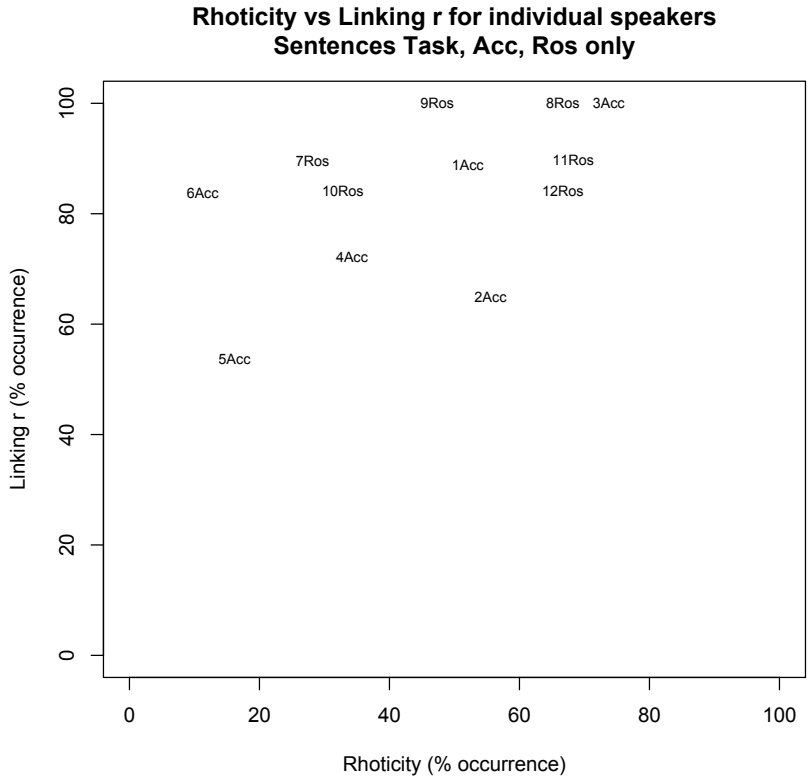


Figure 5.27
Linking-*r* vs rhoticity for individual speakers, sentences task, Accrington and Rossendale speakers only. Spearman's rho = 0.51, p = 0.093.

*5.7.2.2 Sentences task: non-correlation between rhoticity and word-final linking-*r

Filtering the data by morphological context in order to separate word-final linking-*r* from word-internal linking-*r* produces the scatterplot in Figure 5.28. This plot for word-final linking-*r* suggests that there could be a correlation between word-final linking-*r* and rhoticity, but the p value of 0.115 does not allow the null hypothesis to be rejected. It could be that a larger data set would produce a statistically significant correlation (and this is one instance where the conversation data does provide a greater number of tokens per speaker than the reading data set). However, even though Figure 5.28 is at best weakly indicative of a correlation, it does cast light on the apparent anomaly in Figure 5.15, where the level of word-final linking-*r* produced is similar in Prestwich and Accrington, despite Prestwich being strongly non-rhotic and Accrington having the second highest level of rhoticity. The Accrington speakers vary from 74% rhotic to 12% rhotic, and reducing this range to a mean value masks the fact that within the Accrington group of speakers less rhotic speakers do tend to produce lower levels of word-final linking-*r*, which is expected given the New Zealand data. This factor still needs more investigation though:

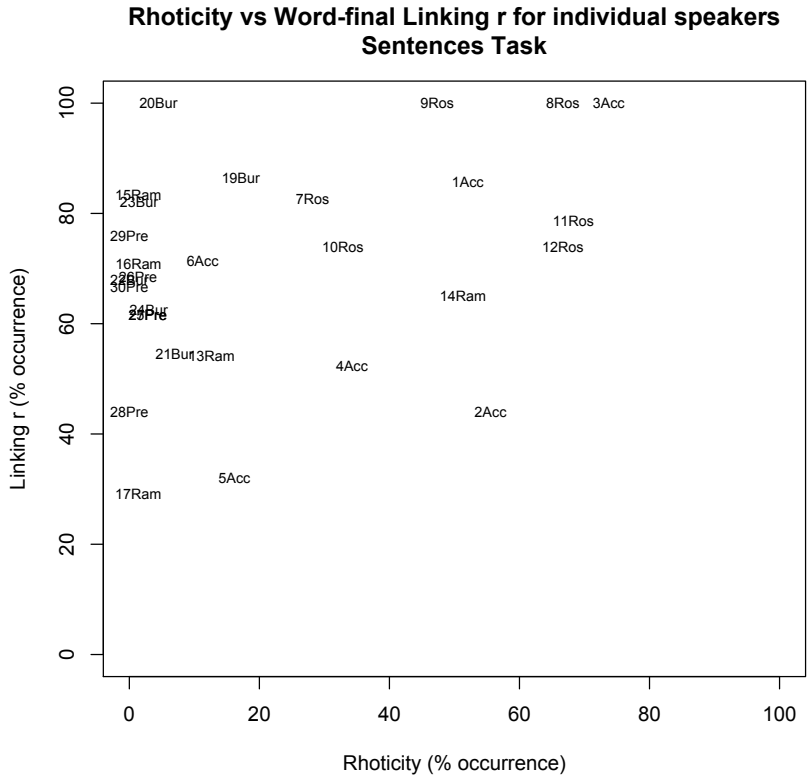


Figure 5.28
Word-final linking-*r* vs rhoticity for individual speakers. Spearman's rho = 0.30, p = 0.115.

it doesn't convincingly match the New Zealand findings, and it is surprising that no statistically significant result can be observed, given the highly significant results for intrusive-*r*.

*5.7.2.3 Sentences task: non-correlation between rhoticity and word-internal linking-*r

Word internal linking-*r* was very different: as suggested by Figure 5.13 it is essentially invariant despite differing levels of rhoticity in different speakers. The scatterplot in Figure 5.29 reinforces this interpretation. Predictably, given the lack of variation in word-internal linking-*r*, there is a complete lack of a correlation (Spearman's rho = 0.02, p = 0.899). This suggests that word-internal linking-*r* is robustly maintained regardless of the level of rhoticity shown by speakers in particular localities.

*5.7.2.4 Elicitation task: non-correlation between rhoticity and linking-*r

There is no statistically significant correlation between level of rhoticity and level of intrusive-*r* in the elicitation task data. This finding is reinforced by consideration of Figure 5.30, which shows that speakers ranging from 0% rhotic to 92% rhotic can all have levels of linking-*r* approaching 100%. This is further evidence that linking-*r* does not pattern in the same way

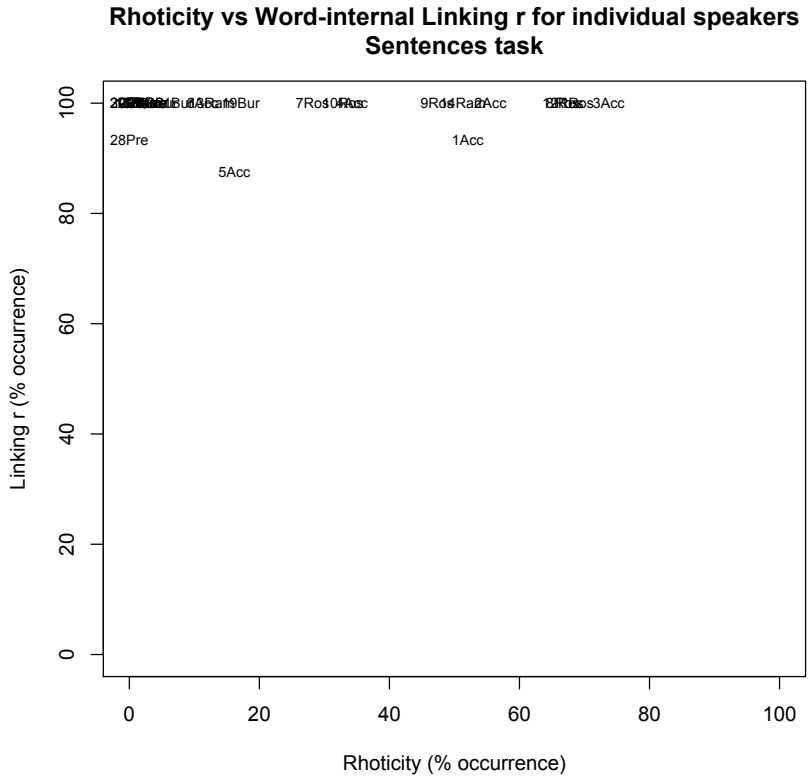


Figure 5.29
Word-internal linking-*r* vs rhoticity for individual speakers. Spearman's rho = 0.02, p = 0.899.

that intrusive-*r* does across a population of speakers of variable rhoticity. While it may be justified to argue that linking-*r* and intrusive-*r* are the same process for non-rhotic speakers, this is not true for rhotic speakers. Rhotic speakers by definition do not need to have a special phonological process in order to produce linking-*r*: they would have a realised *r* whether or not there were a sandhi context. So, the consistently non-rhotic speakers in Figure 5.30 are going through a different phonological process from that used by the consistently rhotic speakers in order to arrive at the same result: consistent realisation of *r* in linking contexts. It is interesting to note the behaviour of those speakers who produce variable percentages of surface-realised coda *r*. I suggest in Section 8.2 that these speakers have underlying coda /ɪ/ and a variable *r*-deletion rule: the linking-*r* percentages in Figure 5.30 show that this proposed *r*-deletion rule does not apply in prevocalic contexts.

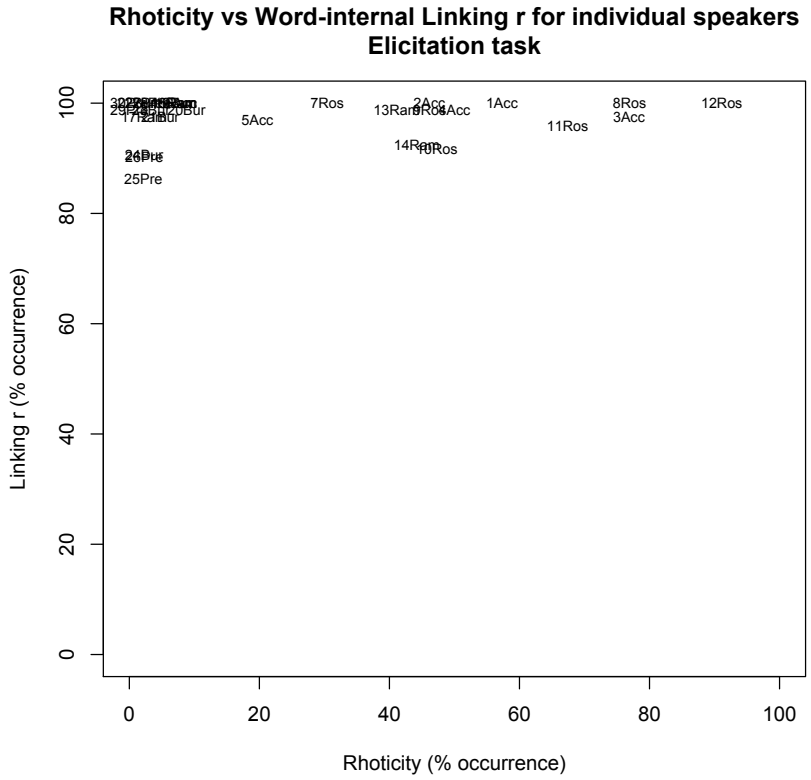


Figure 5.30
Linking-*r* and rhoticity in the elicitation task. Spearman's rho = 0.007, $p = 0.972$

*5.7.3 Rhoticity and intrusive-*r

*5.7.3.1 Sentences task: correlation between rhoticity and intrusive-*r

In order to explore more closely how individual speakers vary in terms of rhoticity and intrusive-*r*, the figures for each speaker's levels of rhoticity and intrusive-*r* were plotted against each other (Figure 5.31). The figures for individual speakers' rhoticity are of course the same as in the comparison of rhoticity with linking-*r* in the sentences task, so their positions on the *x*-axis are the same as in Figure 5.26. The scatterplot in Figure 5.31 indicates a clear negative correlation between level of rhoticity and level of intrusive-*r*: the less rhotic a speaker is, the more frequently they realise intrusive-*r*. Testing using a nonparametric test for correlation confirms this correlation: Spearman's rho = – 0.71, $p < 0.001$. Accrington and Rossendale speakers are the most rhotic and tend to have fewer tokens of intrusive-*r*: Prestwich and Bury speakers are least rhotic and tend to have more tokens of intrusive-*r*. This plot indicates that the range of variation in intrusive-*r* is greater than that for rhoticity: speakers who have levels of intrusive-*r* greater than 20% tend to have low levels of rhoticity, typically under 5%. In contrast,

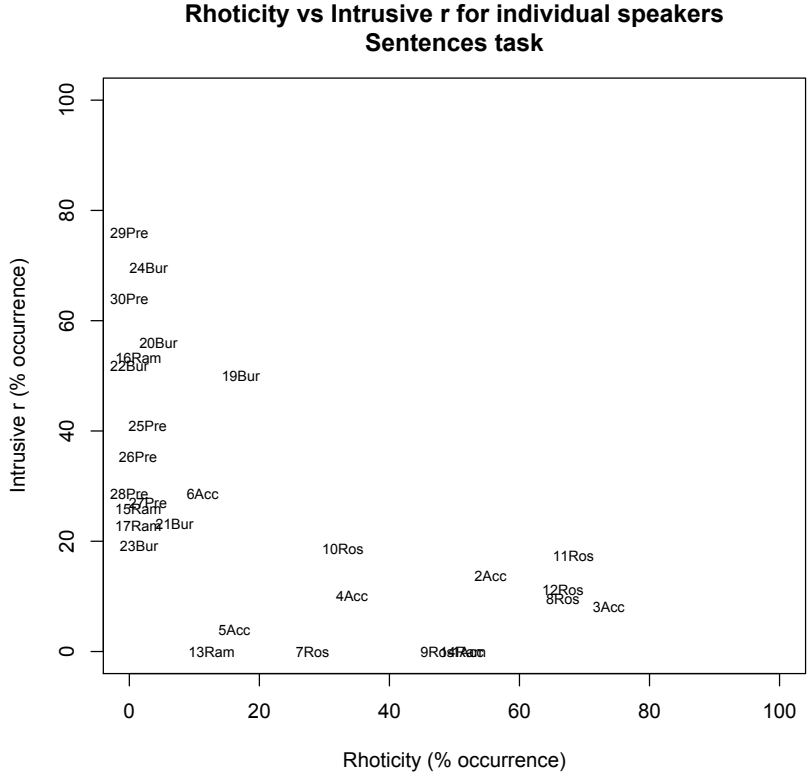


Figure 5.31
Intrusive-*r* vs rhoticity for individual speakers. Spearman's rho = – 0.71, $p < 0.001$

speakers who have levels of rhoticity greater than 20% have more variation in their levels of intrusive-*r*. Some of the most rhotic speakers, with between 70 and 80% rhoticity, can have up to 20% intrusive-*r*.

*5.7.3.2 Sentences task: correlation between rhoticity and word-final intrusive-*r

The scatterplot in Figure 5.31 does not differentiate word-final and word-internal intrusive-*r*. Filtering the results to consider only word-final intrusive-*r* produces the plot in Figure 5.32. This finding matches that of Hay & Sudbury (2005: 814), who obtained a similarly significant negative correlation of rhoticity and word-final intrusive-*r* in their New Zealand data: Spearman's rho = – 0.52, p < 0.03. It is interesting to note, though, that while there is a very similar correlation between rhoticity and intrusive-*r* in the New Zealand and East Lancashire data, the figures were arrived at by different methods: the New Zealand data represent a change over time (both real time and apparent time due to the two sources of the archive recordings during a period of loss of rhoticity in New Zealand English), but the East Lancashire data represent spatially conditioned variation across a transition zone between rhotic and non-rhotic dialect

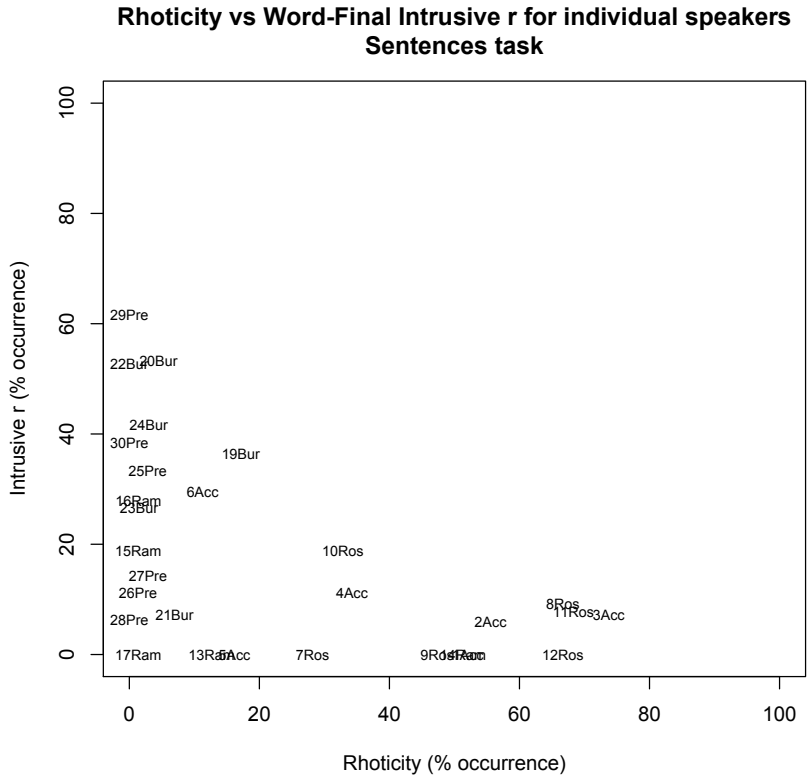


Figure 5.32
Word-final intrusive-*r* vs rhoticity for individual speakers. Spearman's rho = – 0.50, $p = 0.006$

areas. In addition, the East Lancashire corpus includes speakers who are more consistently rhotic than any of the New Zealand speakers, as a comparison between Figure 5.33 (taken from Hay & Sudbury (2005)) and Figure 5.32 indicates. Although the shapes of the scatterplots in Figures 5.32 and 5.33 are similar, the scales on the axes are different. In the New Zealand data there is one speaker with just over 10% rhoticity and just under 10% intrusive-*r*. The speakers with higher levels of intrusive-*r* have much lower levels of rhoticity of under 5%. In Figure 5.32 for the East Lancashire data, there are speakers with around 70% rhoticity and around 10% intrusive-*r*. One speaker has 33% rhoticity and 19% intrusive-*r*. This suggests that although the East Lancashire data for rhoticity covers a wider range of variation than does the archive New Zealand data, the same correlation between level of rhoticity and level of intrusive-*r* exists, and that synchronic spatial variation in these two correlated features matches diachronic patterns of change through time.

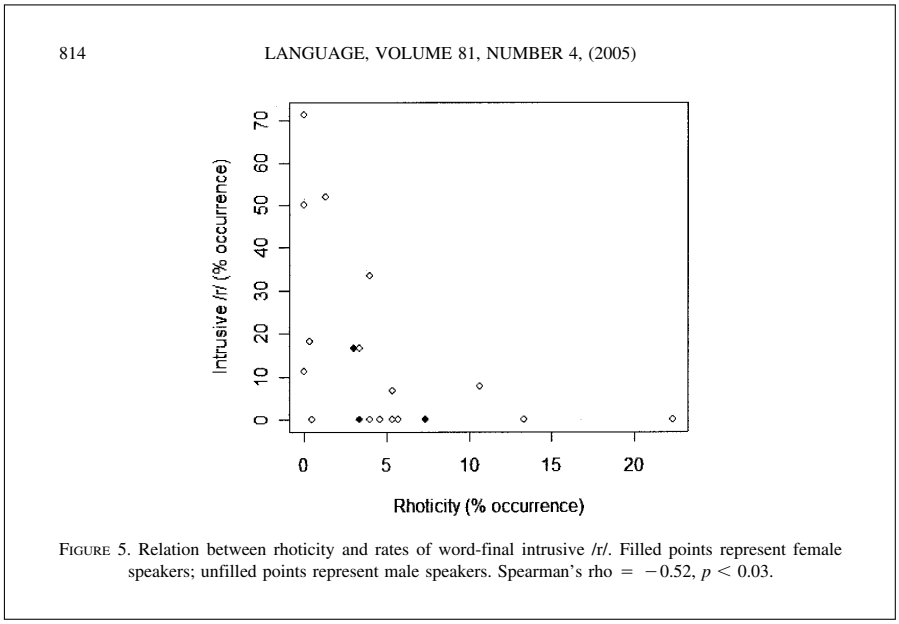


Figure 5.33
from Hay & Sudbury (2005: 814)

*5.7.3.3 Sentences task: correlation between rhoticity and word-internal intrusive-*r

When the data were filtered to include only word-internal tokens of intrusive-*r* the scatterplot in Figure 5.34 was produced. There is a stronger negative correlation between word-internal intrusive-*r* and rhoticity than between word-final intrusive-*r* and rhoticity. This means that, across the sample population as a whole, a speaker has to be more consistently non-rhotic in order for her to produce word-internal intrusive-*r* in examples such as *drawing*. A partially rhotic speaker may have already developed an intrusive-*r* process at word boundaries but is less likely to produce word-internal intrusive-*r*. This finding again matches Hay & Sudbury's conclusions on the New Zealand data: 'intrusive /r/ was more likely to occur across word boundaries than morpheme boundaries' (2005: 816). This is true for the population as a whole, but looking at the place labels in Figure 5.34 and comparing them to Figure 5.31 shows that speakers 2Acc and 11Ros actually produce a greater proportion of word-internal intrusive-*r* tokens than they do for word-final intrusive-*r*. These cases go against the overall pattern in the data, and require some further investigation. It could suggest that the relationship between rhoticity and intrusive-*r* is different for these more strongly rhotic speakers. For the moment I note that speakers 2Acc and 11Ros have an unusual pattern, and it will be seen in Section 5.7.3.4 that these speakers diverge from most other speakers in their elicitation task data too.

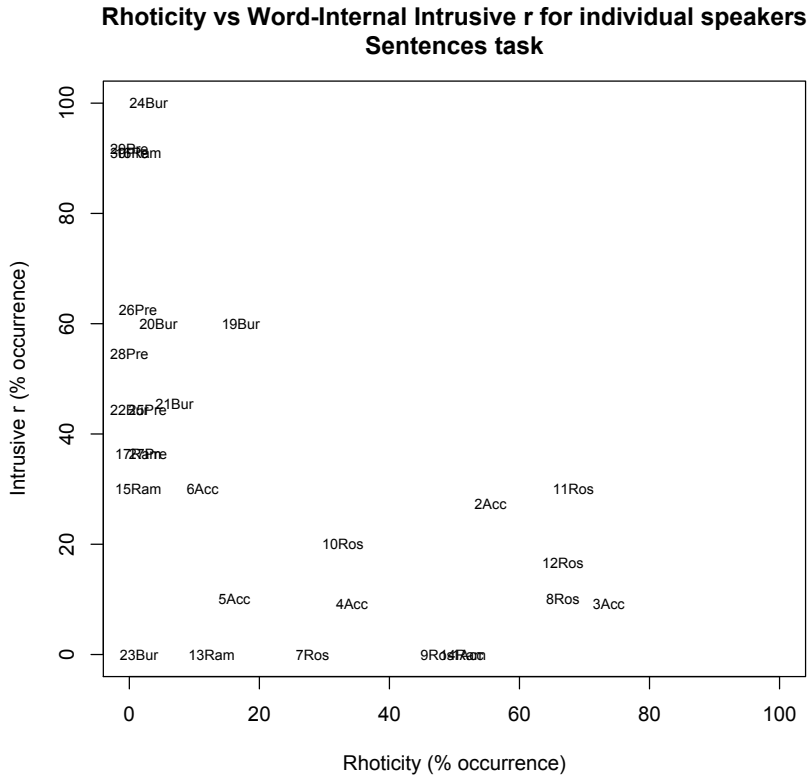


Figure 5.34
Word-internal intrusive-*r* vs rhoticity for individual speakers. Spearman's rho = – 0.63, $p < 0.001$

5.7.3.4 Elicitation task: correlation between rhoticity and intrusive-r

Figure 5.35 shows word-internal intrusive-*r* and rhoticity in the elicitation task. A correlation test gives Spearman's rho = -0.39, p = 0.035. Here there is a negative correlation, such that lower levels of rhoticity are linked to higher levels of intrusive-*r*. See Figure 5.34 for the equivalent correlation using sentences task data. However, this correlation is smaller (Spearman's rho = -0.39 compared to -0.63 for the sentences data). This reflects the lack of a clear relation between rhoticity and intrusive-*r* for groups such as the young Rossendale speakers.

If the young speakers are considered in isolation, then no significant correlation is obtained. Figure 5.36 shows intrusive-*r* and rhoticity in the elicitation task for the younger speakers only: Spearman's rho = -0.43, p = 0.128 i.e. not significant.

Returning to the complete data set for both age groups (Figure 5.35), speakers 2Acc, 8Ros, 10Ros and 11Ros appear to be outliers with surprisingly high levels of intrusive-*r* given their high rhoticity. If these four speakers are removed from the correlation test, then the results are Spearman's rho = -0.62, $p = 0.001$. This correlation is much stronger, and is almost the same as for the sentences task. It would seem that these four speakers are behaving differently in

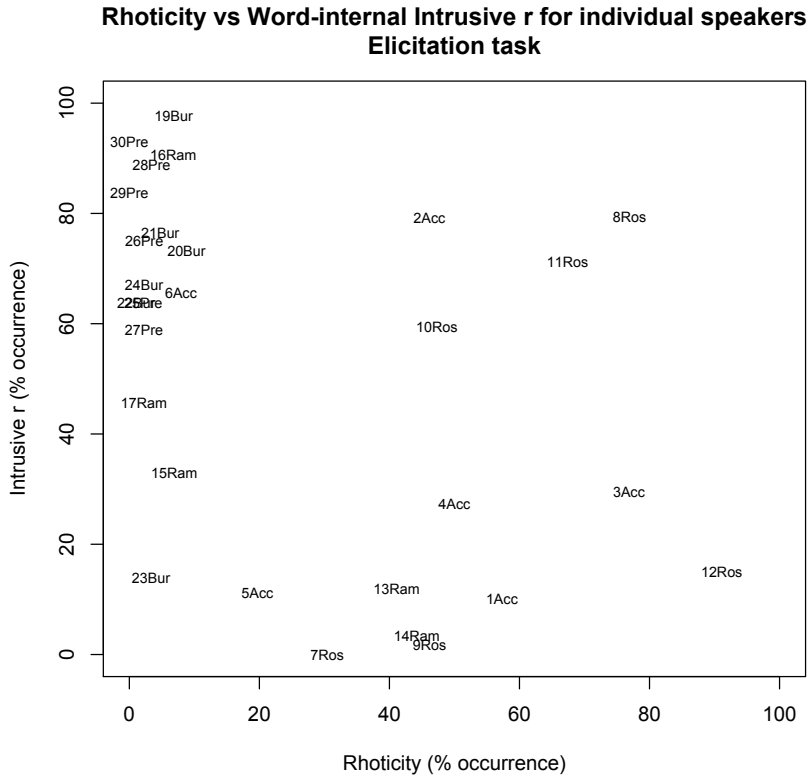


Figure 5.35
Intrusive-*r* and rhoticity in the elicitation task. Spearman's rho = -0.39, p = 0.035.

the elicitation task compared to their behaviour in the sentences task. This can be checked in general correlation tests between the data for these two tasks.

5.7.4 Comparison of results in the two non-spontaneous speech tasks.

For the reasons discussed in the methods chapter, and because the global multivariate analyses show that task style is a significant factor in the production of *r*-sandhi, the results of the two non-spontaneous speech tasks will be considered separately. However, it would clearly be useful to test whether the speakers produced results which were consistent across the two tasks, or whether there were diverging patterns. Levels of rhoticity, linking-*r* and intrusive-*r* across the two tasks will be considered in the following sections.

5.7.4.1 Comparison of levels of rhoticity in the sentences task and the elicitation task.

The scatterplot in Figure 5.37 suggests a strong positive correlation between rhoticity levels in the sentences and elicitation tasks: the distribution of points on the scatterplot suggests a linear relationship, where, for example, speaker 3Acc has approximately 80% rhoticity in both tasks and speaker 5Acc has approximately 20% rhoticity in both tasks. A nonparametric test

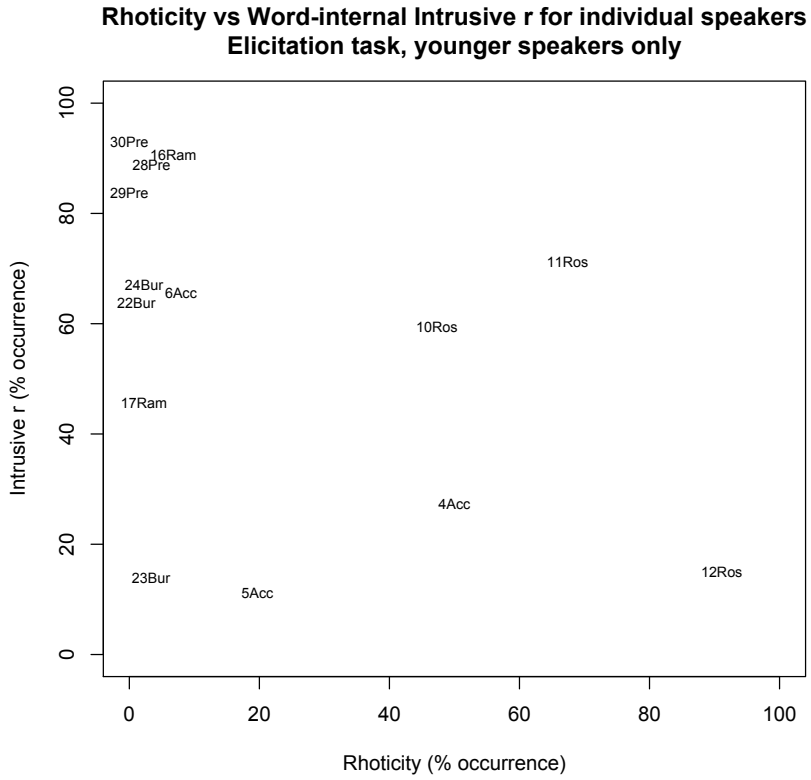


Figure 5.36
Intrusive-*r* and rhoticity in the elicitation task, younger speakers.

for correlation gives a value for Spearman's rho = 0.91, p < 0.001, which suggests that there is indeed a strong correlation, and that this result is extremely unlikely to have arisen by chance.

The trend in Figure 5.37 is that most speakers do not vary their levels of rhoticity in the different tasks. Where there are differences between the tasks the elicitation task produces slightly higher levels of rhoticity, as is seen for speakers 12 (Rossendale Younger) and 13 (Ramsbottom Older). The nature of the elicitation task means that although there are high token counts, these are based on a limited set of lexical items: the rhoticity scores are based on the occurrence of coda-*r* in bases such as *Darwen* or *Burnley* and suffix *–er*, which are repeated in various combinations. In the sentences task there is a wider range of lexical items which are not repeated to the same extent. Despite this structural difference, and despite potential differences in speech style in the two tasks, levels of rhoticity are fairly constant.

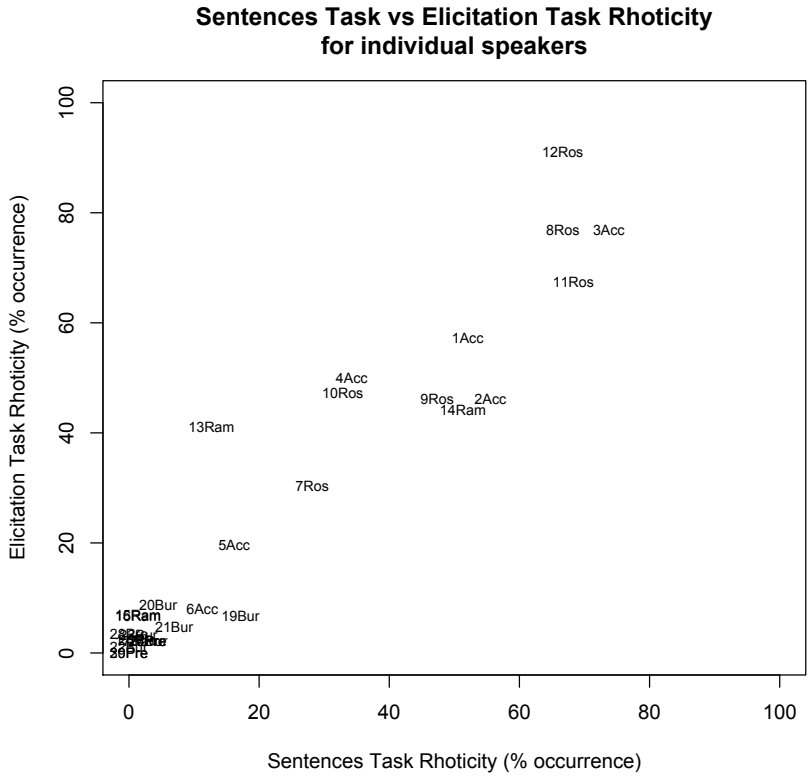


Figure 5.37
Rhoticity in the sentences and elicitation tasks. Spearman's rho = 0.91, p < 0.001.

*5.7.4.2 Comparison of word-internal intrusive-*r *across the sentences and elicitation tasks.*

Given the nature of the elicitation task, any tokens of intrusive-*r* will be word-internal (although there is a range of different suffixes, it is not clear that speakers consistently had different morphophonological patterns with these different suffixes: very few speakers had stress movement when suffixing with -IAN, for example). Figure 5.38 compares word-internal intrusive-*r* across the two tasks. A test of correlation gives Spearman's rho = 0.82, $p < 0.001$ (very low indeed). So here there is again a correlation between people's production of word-internal intrusive-*r* in the Sentences and Elicitation tasks. There is slightly more variation between the two tasks for individual speakers than there is in the rhoticity figures, suggesting either that intrusive-*r* is slightly more likely to vary in different styles of speech than is rhoticity, or that intrusive-*r* is inherently more variable in its realisation. There is a trend for speakers to have higher levels of intrusive-*r* in the elicitation task than in the sentences task. This will be returned to in Section 5.7.5 discussing the elicitation task. However, the variation is not very large: the Spearman's rho is still high at 0.8.

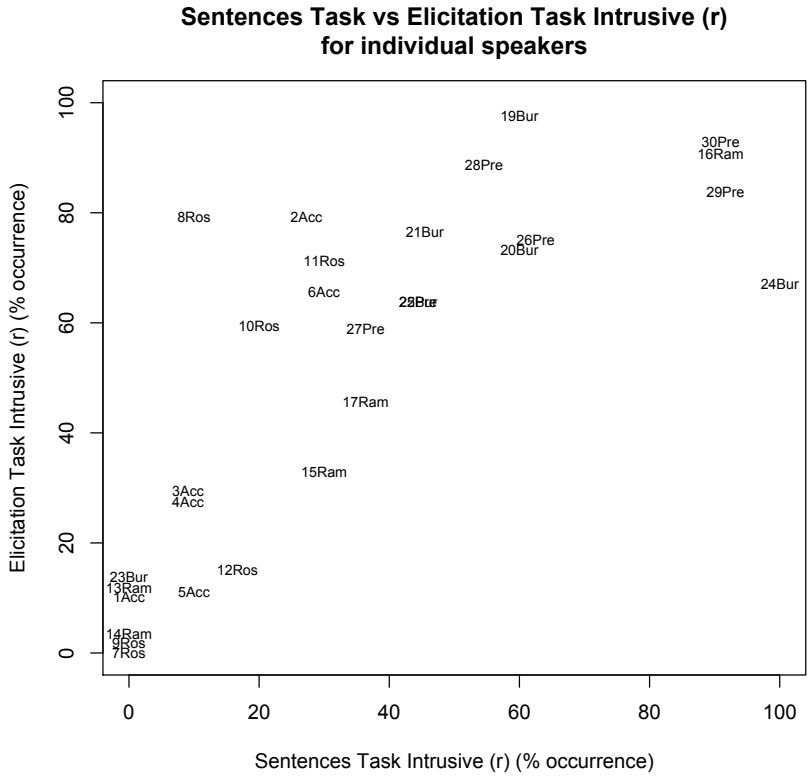


Figure 5.38
Intrusive-*r* in the sentences and elicitation tasks. Spearman's rho = 0.82, $p < 0.001$.

*5.7.4.3 Comparison of word-internal linking-*r *across the sentences and elicitation tasks.*

For word-internal linking-*r* in the sentences and elicitation tasks there is little variation for any of the speakers, with most speakers nearing 100% realisation of linking-*r* in both tasks, as can be seen in Figure 5.39. As a result, a Spearman's correlation produces no significant result, with the *p* value varying widely (but never falling below the 0.05 threshold) across the ten runs of the Spearman's test. The lowest Spearman's rho recorded is 0.07, but with p = 0.711 the null hypothesis cannot be ruled out.

Despite the slight variation in levels of intrusive-*r* across the sentences and elicitation tasks, overall there are strong correlations for distributions of coda-*r* across the two tasks and linking-*r* has almost no variation anyway, so the issue of correlation across the two tasks does not arise for linking-*r*. The difference in the distribution of intrusive-*r* may suggest that some speakers had different processes leading to the production of intrusive-*r* in the two tasks.

The set of four potentially outlying speakers (2Acc, 8Ros, 10Ros and 11Ros) discussed with reference to Figure 5.35 also emerges in Figure 5.38: they have higher levels of intrusive-*r* in the elicitation task than they do in the sentences task. That reinforces the idea that there is a

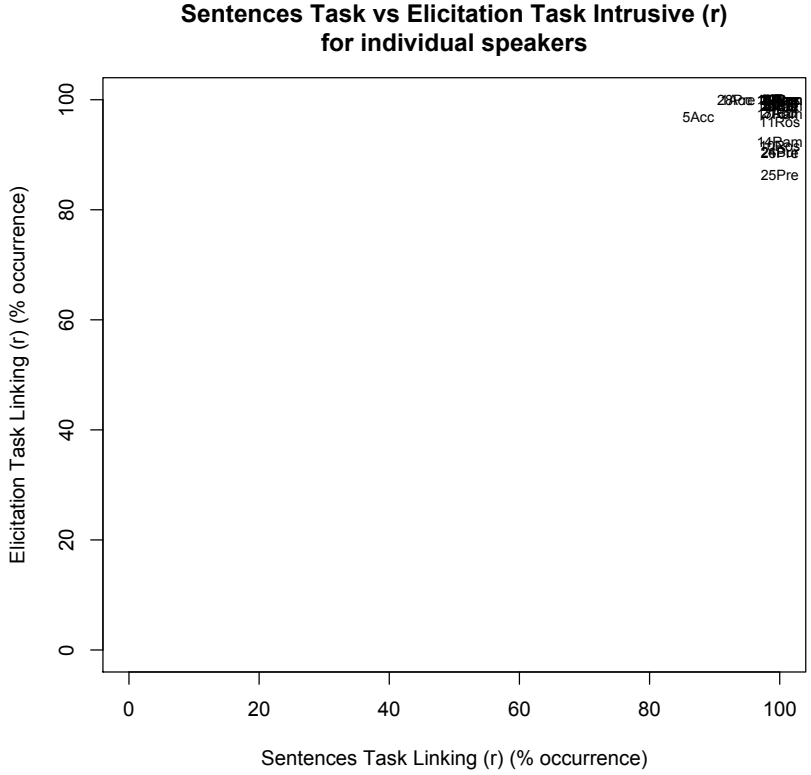


Figure 5.39
Linking-*r* in the sentences and elicitation tasks. Spearman's rho 0.07 p = 0.712 (non-significant).

task-style effect on their production of intrusive-*r*, even though their levels of rhoticity are fairly similar across the two tasks.

*5.7.5 Intrusive-*r *over the course of the elicitation task: is there a priming effect?*

As Figure 5.38 shows, some fairly consistently rhotic speakers (2Acc, 8Ros, 10Ros and 11Ros) appear to shift their behaviour in the elicitation task by producing higher than expected levels of intrusive-*r*. We might hypothesise that there is some sort of conditioning effect, given the heavy repetition of fairly similar contexts in the elicitation task. For example, during the task speakers have to produce many linking examples such as *Scar + ish*, and they are fairly consistent in their realisation of linking-*r* as ++. When they are also exposed to the orthographic prompt *Sca + ish* it may be that as the task progresses they have a higher likelihood of producing intrusive-*r* by analogy with the linking examples. This priming effect does not seem to apply to the majority of speakers, who do not vary much across the two tasks, but it may explain the higher values for elicitation task intrusive-*r* for the small group previously discussed.

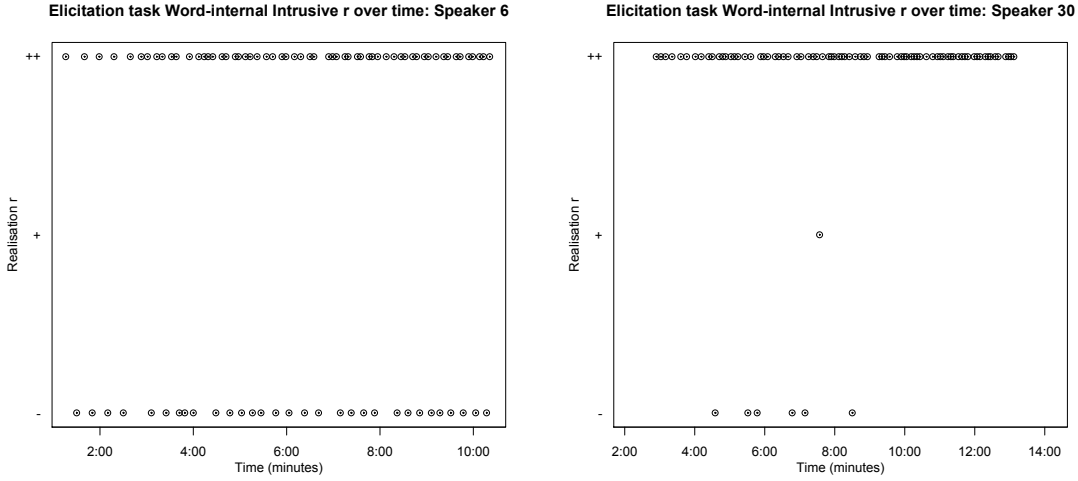


Figure 5.40
Intrusive-*r* over time in the elicitation task, speakers 6 and 30: no priming effect.

If there is a priming effect for some speakers, such that over the course of the elicitation task they in effect 'learn' that intrusive-*r* is a strategy for avoiding an awkward vowel hiatus by analogy with linking-*r*, you would expect the rates of intrusive-*r* to increase over the timescale of the task. Near the start of the task the speaker may vary between options at intrusive contexts (producing –, + or ++), but as the task progresses the speaker may tend to favour + or ++ at intrusive contexts because they have been producing ++ in similar phonological contexts where an orthographic ⟨r⟩ prompts a linking-*r* realisation (*Scar+ish* versus *Sca+ish*, for example). By plotting each token of potential intrusive-*r* against the time of its utterance, this can be investigated. Figure 5.40 shows two examples: speaker 6Acc and speaker 30Pre. Each speaker took different lengths of time to complete the task, so for ease of comparison the time axis for each speaker is scaled between her first utterance and her last utterance. Both of the speakers in Figure 5.40 show no noticeable alteration in the rate of intrusive-*r* production over the course of the task. Speaker 6Acc is variable throughout the duration of the task, sometimes realising an intrusive-*r* as ++ and sometimes not realising an *r*, as indicated by the – tokens. In contrast, speaker 30Pre is much more consistently *r*-intruding throughout the task. Neither speaker shows any particular change during the task: there is no evidence that either speaker moves towards using one realisation of *r* as the task progresses.

Figure 5.41 shows the results over time for Speakers 10Ros and 11Ros, both of whom had higher proportions of realised intrusive-*r* in the elicitation task than in the sentences task (see Figure 5.38). However, as can be seen in the time graphs for these two speakers, they do not

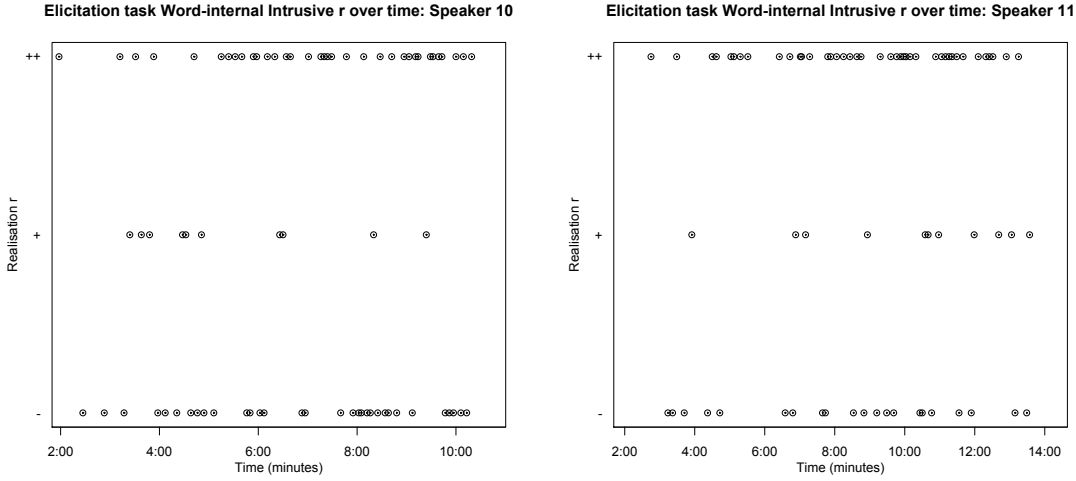


Figure 5.41
Intrusive-*r* over time in the elicitation task, speakers 10 and 11: no priming effect.

alter their production of intrusive-*r* over the duration of the task. Both speakers are very variable, producing –, + and ++ in intrusive contexts, and maintain this variability as they work through the task. This variation suggests that even though they use + and ++ realisations of *r* more frequently in the elicitation task than in the sentences task, this is not due to a priming effect: they do not become primed to use *r* as a hiatus resolution strategy over the course of the task.

Speaker 8Ros has the highest level of word-internal intrusive-*r* in the elicitation task compared to her performance in the sentences task: 79% realised word-internal intrusive-*r* in the elicitation task and 10% realised word-internal intrusive-*r* in the sentences task. Her production of intrusive-*r* over time in the elicitation task is given in the left panel of Figure 5.42. Unlike the other speakers so far analysed in this way, speaker 8Ros does seem to show a slight change in her production of intrusive-*r* over the course of the task. While she is quite variable in her realisation of intrusive-*r*, producing –, + and ++ tokens, towards the end of the task she seems to settle on ++ as her method of dealing with hiatus intrusive-*r* contexts. After 14 minutes, almost all of her intrusive-*r* tokens are ++. However, the same is true of Speaker 17Ram, as shown in the right panel of Figure 5.42. This speaker varies much less in her production of intrusive-*r* across the two tasks: 46% in the elicitation task and 36% in the sentences task. Even though there is a similar distribution of variants over the course of the elicitation task, with speaker 17Ram gradually coming to favour ++ realisations towards the end of the task, this does not reflect an overall level of realised intrusive-*r* in the elicitation task that is very different from that in the sentences task.

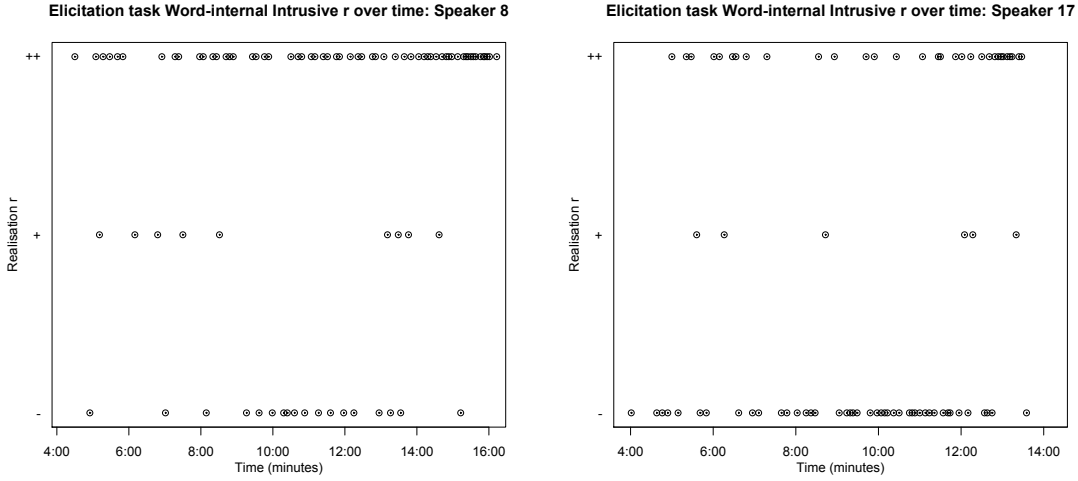


Figure 5.42
Intrusive-*r* over time in the elicitation task, speakers 8 and 17: possible slight priming effect.

Unlike speaker 8Ros, speaker 17Ram is essentially non-rhotic (2% rhoticity in the elicitation task), so phonologically would be expected to be approaching the elicitation task from a different starting point, possibly with intrusive-*r* as an active and productive feature of her phonological system. Although towards the end of the task (from 12 minutes onwards) she does seem to settle on ++ as her favoured method of dealing with intrusive-*r* hiatus contexts, the effect is quite small. Indeed, none of the speakers has a pattern in which intrusive-*r* is consistently (non)realised as – near the start of the task and moves towards ++ by the end of the task. Furthermore, even the small potential priming effect observed for 8Ros and 17Ram is not consistent and is not shared by the rest of the 'outlying' group of speakers 2Acc, 10Ros and 11Ros, so it does not explain their increased preference for intrusive-*r* as ++ in the elicitation task as compared to the sentences task.

The tendency for increased levels of word-internal intrusive-*r* in the elicitation task may be explained by some sort of priming effect across the interview as a whole: the elicitation task was the final task for each speaker. However, despite the exposure to repeated potential intrusive-*r* contexts, no speakers seemed consciously aware that the presence or absence of intrusive-*r* was at issue in completing the task. Although several speakers commented on the difficulty of saying some of the suffixed forms, none of them commented on potential parallels between examples such as *Scar + ish* and *Sca + ish*.

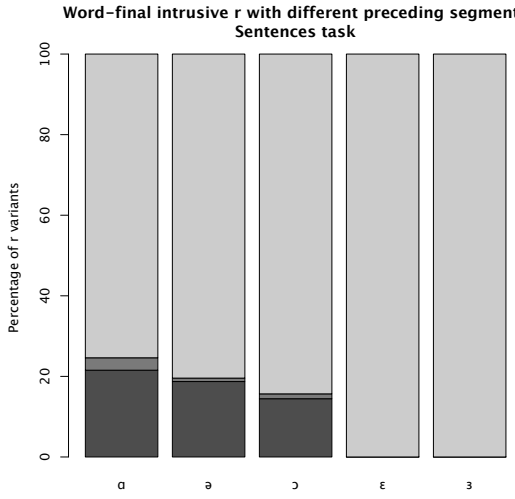


Figure 5.43
Word-final intrusive-*r* by preceding segment for all speakers.

5.8 Influence of preceding segment on *r*-sandhi and rhoticity in the sentences task data

*5.8.1 Influence of preceding segment on production of intrusive-*r

*5.8.1.1 Word-final intrusive-*r *and preceding segment*

When data for all speakers in the sentences task are collated, the proportions of realised word-final intrusive-*r* after a range of preceding segments are as shown in Figure 5.43. A basic statistical test for the significance of this distribution involves using a chi-square test to see whether the different preceding segments differed significantly from each other in terms of realisation of following intrusive-*r*. This approach does not take individual speakers into account (which is a problem shared by several traditional sociolinguistic approaches to data analysis: see Section 5.2). It does, however, provide an indication of the potential significance of the preceding segment on the production of intrusive-*r* across the data set of tokens. It tests for whether the variant realisations of *r* (–, +, ++) are independently distributed across tokens with various preceding segments. The distribution in Table 5.18 and Figure 5.43 is not significant (χ^2 = 7.84, d.f. = 8, p = 0.449). Despite this lack of statistical significance, the trends in the observed data are that potential intrusive contexts preceded by /ɔ/ are less frequently realised with the production of an intrusive-*r* than contexts preceded by /ɑ/ or /ə/. This tendency is in line with widely discussed ideas that intrusive-*r* developed later after /ɔ/ than after /ɑ/ or /ə/ (see Wells 1982), or that intrusive-*r* is more salient or more stigmatised after /ɔ/ than after other vowels. These data also

	ɑ	ə	ɔ	ɛ	ɜ
–	49	189	70	13	5
+	2	2	1	0	0
++	14	44	12	0	0
Total	65	235	83	13	5

Table 5.18
Raw figures for intrusive-*r* at word boundaries by preceding segment. (χ^2 = 7.84, d.f. = 8, p = 0.449).

	ɑ	ə	ɔ	ɛ	ɜ
–	62	38	67	23	4
+	3	0	5	2	1
++	31	40	16	3	4
Total	96	78	88	28	9

Table 5.19
Raw figures for intrusive-*r* at word-internal morpheme boundaries by preceding segment. (χ^2 = 31.92, d.f. = 8, p < 0.001).

show that a preceding /ɛ/ or /ɜ/ is even less likely to lead to the production of an intrusive-*r*. These results must be understood in the light of the raw token counts for this environment (Table 5.18). There are far fewer tokens for a preceding /ɛ, ɜ/ than for /ɑ, ə, ɔ/ despite the constructed nature of the reading task. The word final context for /ɛ/ consists solely of the collocation *yeah instead*, and indeed, several of the speakers read the sentence with a clear pause between these two words, thereby removing the context for sandhi. For this reason, these tokens were not counted. The remaining speakers' tokens all resulted in the non-appearance of *r*, and instead either a smooth non-*r* transition between the two vowels was produced, or a glottal stop was present in the hiatus position. Word-final /ɜ/ is even less well represented, reflecting the fact that /ɜ/ is always a reflex of an historical /r/ (apart from the single example *colonel*) and so by definition intrusive-*r* contexts are non-existent. The reading data included the collocation *uhhh until* in an attempt to elicit a hesitation particle which might be realised as a central vowel. Only five speakers produced such a vowel here, and all of these speakers failed to produce a following intrusive-*r*.

5.8.1.2 Word-internal intrusive-r and preceding segment

Figure 5.44 shows the occurrence of intrusive-*r* at word-internal morpheme boundaries in the sentences data. The raw figures are given in Table 5.19.

The distribution in Table 5.19 and Figure 5.44 is highly significant (χ^2 = 31.92, d.f. = 8, p < 0.001). Although this does not indicate which individual preceding segments are most likely to lead to a realised intrusive-*r*, it does suggest that there is a difference between word-final and

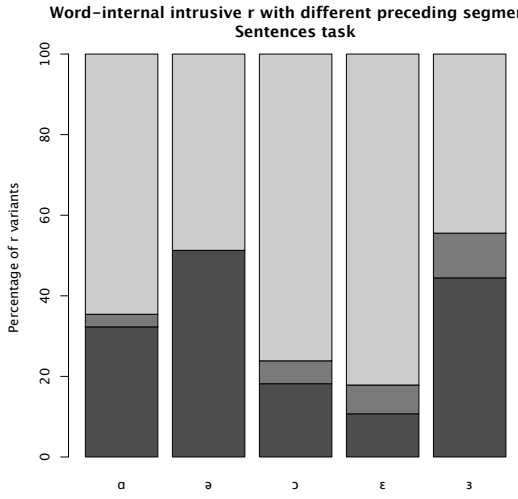


Figure 5.44
Word-internal intrusive-*r* by preceding segment for all speakers.

word-internal contexts. Again, the data for /ɛ, ɜ/ are based on a small number of tokens, and the examples themselves are relatively obscure given the lack of full lexical items where /ɜ/ is not a reflex of historical /ɹ/. The example *yeah-ing* predictably produced some difficulty for some speakers, who paused as they read the word. Most speakers had either an *r*-less transition between the vowels or a glottal stop in the hiatus position. Interestingly, the column for preceding /ɜ/ shows a higher proportion of realised intrusive-*r* than is the case for preceding /ɛ/.

Two things are worth noting here. First, this conclusion is based on a very small number of tokens because most speakers paused at these boundaries and avoided creating a sandhi context. Second, the example *uhhh-ing* was slightly more likely to be familiar from real-world uses: where speakers did produce a fluent pronunciation, they were quite likely to produce an intrusive-*r*. It is possible, however, that some speakers assumed there was an underlying /ɹ/, despite the lack of an orthographic ⟨r⟩ in the written material. The spelling ⟨uhhh⟩ was an attempt to indicate a long hesitation particle [ɜː] without using an orthographic ⟨r⟩. However, in England, where the prestige spoken variety is non-rhotic, ⟨er⟩ is more conventionally used to represent the hesitation particle, so the issue of whether or not there is an underlying /ɹ/ is unclear. For these reasons, again the main focus is on tokens with preceding /ɑ, ə, ɔ/.

Tokens preceded by /ɔ/ were least likely to lead to production of intrusive-*r*, and as with word-final intrusive-*r*, this matches claims made about the development of intrusive-*r* after /ɔ/ in other varieties of English. The most noticeable difference between the data for word-final

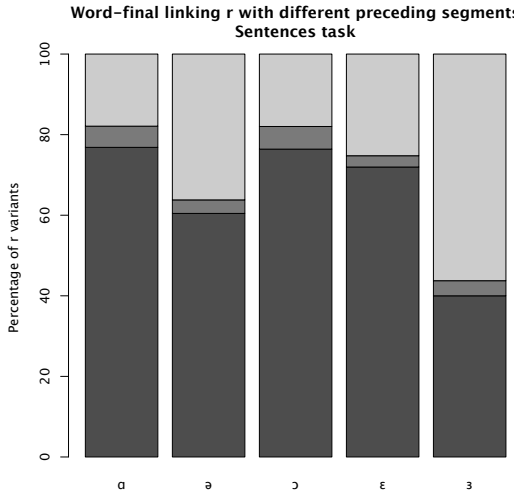


Figure 5.45
Word-final linking-*r* by preceding segment for all speakers.

	ɑ	ə	ɔ	ɛ	ɜ
–	17	97	16	27	45
+	5	9	5	3	3
++	73	162	68	77	32
Total	95	268	89	107	80

Table 5.20
Raw figures for linking-*r* at word-final boundaries by preceding segment. (χ^2 = 43, d.f. = 4, p < 0.001)

and word-internal intrusive-*r* concerns tokens preceded by schwa. In the word-internal data, a preceding schwa is more likely to lead to production of intrusive-*r* than either /ɑ/ or /ɔ/. Given the phonetic similarity between a schwa and the approximant [ɹ] typically produced by the East Lancashire speakers it could be argued that adding consonantal constriction to fill the hiatus between the schwa and the following vowel does not require as much articulatory effort as would be the case following other vowels. It is also possible that the particular examples with preceding schwa in the reading task are less forced than those for other vowels: *vanilla-y* and *China-esque* are perhaps more similar to real-world occurrences than *Shah-ish*. However, examples such as *baa-ing* are by no means unheard of, and *drawing* and *sawing* are everyday words.

*5.8.2 Influence of preceding segment on production of linking-*r

*5.8.2.1 Word-final linking-*r *and preceding segment*

Figure 5.45 shows the occurrence of linking-*r* at word-final boundaries in the sentences data. The raw figures are given in Table 5.20. The distribution in Table 5.20 and Figure 5.45 is

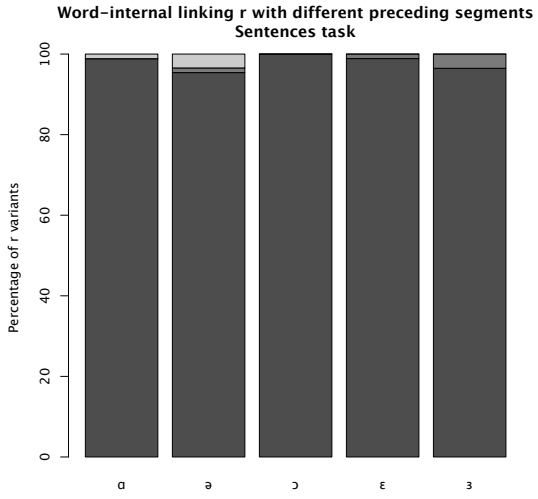


Figure 5.46
Word-internal linking-*r* by preceding segment for all speakers.

highly significant (χ^2 = 43, d.f. = 4, $p < 0.001$) considering + and ++ tokens as indications of *r*-ful realisations, and – tokens as *r*-less realisations. These data are more balanced in terms of total token counts across the set of preceding vowels than are the data for intrusive contexts: examples of word-final /ɛ, ɜ/ where there is an etymological *r* are more frequent than those without, as discussed above. The figures for linking-*r* preceded by /ɑ/ and /ɔ/ are very similar, but a preceding schwa is less likely to lead to production of a linking-*r*. Although it may seem intuitive that unstressed word-final syllables may be most likely to have the potential for non-realisation of *r*, it is interesting that the opposite is true of word-internal intrusive-*r* tokens. The clearest link, though, is with realisation of coda-*r* (see Figure 5.47), where a preceding schwa in a word-final context is also less likely to lead to realisation of *r* as a consonantal *r* than are preceding /ɑ, ɔ/. This suggests that speakers with lower rates of coda-*r* after schwa also have lower word-final linking-*r* after schwa, so lower rhoticity does link to some extent with lower linking-*r*.

*5.8.2.2 Word-internal linking-*r *and preceding segment*

Figure 5.46 shows the occurrence of linking-*r* at word-internal morpheme boundaries in the sentences data. The raw figures are given in Table 5.21. The distribution in Table 5.21 and Figure 5.46 is not significant (χ^2 = 14.7, d.f. = 8, p = 0.07). Just as there was very little variation in realisation of word-internal linking-*r* in different localities, there is almost no variation in the realisation of word-internal linking-*r* with different preceding vowels.

	ɑ	ə	ɔ	ɛ	ɜ
–	1	3	0	0	0
+	0	1	0	1	3
++	86	83	85	88	82
Total	87	87	85	89	85

Table 5.21
Raw figures for linking-*r* at word-internal morpheme boundaries by preceding segment. (χ^2 = 14.7, d.f. = 8, p = 0.07).

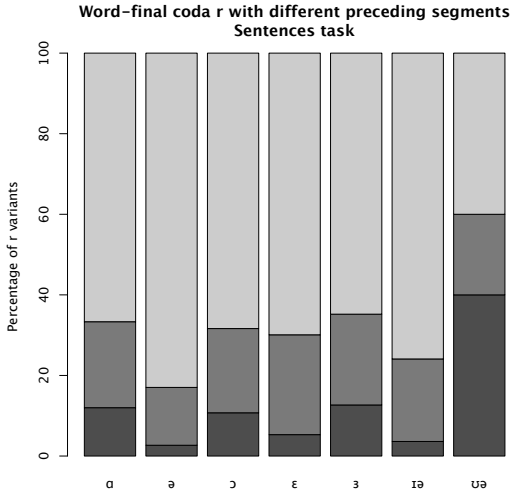


Figure 5.47
Word-final coda-*r* by preceding segment for all speakers.

	ɑ	ə	ɔ	ɛ	ɜ	ɪə	ʊə
–	50	341	121	76	46	63	2
+	16	59	37	28	16	17	1
++	9	11	19	6	9	3	2
Total	75	411	177	110	71	83	5

Table 5.22
Raw figures for coda-*r* at word-final boundaries by preceding segment. (χ^2 = 48.3, d.f. = 12, p < 0.001).

*5.8.3 Variation in production of coda-*r *by preceding segment*

*5.8.3.1 Word-final coda-*r

Figure 5.47 shows the occurrence of coda-*r* at word-final position in the sentences data. The centring diphthongs [ɪə] and [ʊə] would be expected to be a feature of non-rhotic speech. I found that the variably rhotic speakers almost always had pre-*r* breaking, so that even if they had some level of rhoticity (*r*-colouring) in these contexts, their surface form was [ɪɚ] or [ɪəɹ], rather than [ir] as is heard in more robustly rhotic varieties such as Scottish Standard English. Almost all speakers had [ɔ] in ⟨-oor⟩ words, so tokens of [ʊə] were very infrequent. The raw figures are given in Table 5.22. The distribution in Table 5.22 and Figure 5.47 is highly significant (χ^2

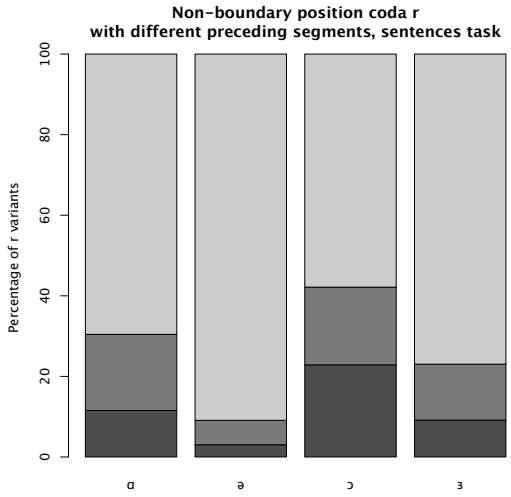


Figure 5.48
Non-boundary position coda-*r* by preceding segment for all speakers.

= 48.3, d.f. = 12, $p < 0.001$). The overall proportions of realised coda-*r* are low because the figures include data from all speakers, some of whom consistently have – realisations in coda-*r* contexts. However, including data from all speakers does indicate if any particular preceding vowels affect the production of coda-*r*. The fairly even scores for /ɑ, ɔ, ɛ, ɜ/ suggest that the preceding segment does not affect the likelihood of producing a coda-*r*, with the exception of a preceding schwa, which is much less likely to lead to production of coda-*r*. This result is not simply a link to stress though: in the coding, schwa does not occur in stressed syllables (either lexical stress or phrasal stress), but other vowels can occur in syllables that are phrasally unstressed, depending on their context in the utterance. Effectively, the schwa category is the *lett*ER lexical set, and these data suggest that if there is a variation in rhoticity, then this set is the least securely rhotic context.

*5.8.3.2 Other tokens of coda-*r

There were very few morpheme-boundary tokens of coda-*r* in the sentences data (*air*r*port*, *cover*r*ed*, *Cumber*r*land*) and so there is insufficient data for analysis. However, coda-*r* is not limited to boundary positions as are linking or intrusive-*r*. Figure 5.48 represents coda-*r* in non-boundary positions, as in examples from the reading task such as *postcard* or *word*. The raw figures are given in Table 5.23. The distribution in Table 5.23 and Figure 5.48 is highly significant (χ^2 = 29.8, d.f. = 6, $p < 0.001$). Here there is more variation in the production of coda-*r*: although

	ɑ	ə	ɔ	ɜ
–	199	30	81	244
+	54	2	27	44
++	33	1	32	29
Total	286	33	140	317

Table 5.23
Raw figures for coda-*r* at non-boundary positions by preceding segment. (χ^2 = 29.8, d.f. = 6, $p < 0.001$).

	intrusive-*r*	linking-*r*	coda-*r*
Word-final	No	Yes	Yes
Non word-final	Yes	No	Yes

Table 5.24
Is the realisation of *r* by preceding segment significant?

the figure for preceding schwa is again low, the figure for preceding /ɔ/ is comparatively higher. (There are no non-boundary tokens preceded by /ɛ/ in the data).

5.8.4 Summary of effects of preceding segment

Table 5.24 summarises the preceding findings. These present an interesting pattern: while coda-*r* differs significantly in its realisation across different preceding segments whether it is word-final or in a non-word-final cluster, linking and intrusive-*r* mirror each other in terms of the significance of the preceding segment according to the morphological context. Word-final linking-*r* varies significantly with respect to preceding segment; word-internal linking-*r* does not. Word-internal intrusive-*r* varies significantly with respect to preceding segment; word-final intrusive-*r* does not. The fact that linking and intrusive-*r* pattern differently for word-final and word-internal contexts matches Hay and Sudbury's (2005: 816) findings, and suggests that in a population where some speakers are variably rhotic and are in the process of developing *r*-sandhi, word-final linking-*r* is more variable than word-internal linking-*r*. Figure 5.46 shows this difference clearly. The consistent production of surface *r* in word-internal linking contexts is clearly a factor in the lack of significance of the preceding segment: linking-*r* is likely to be realised in any case, regardless of the preceding segment. The pattern for intrusive-*r* is less obvious: Figures 5.43 and 5.44 both indicate a degree of variation across different preceding segments. However, the significance testing suggests that word-internal intrusive-*r* could be more variable (and hence more susceptible to influence by preceding segment) than word-final intrusive-*r*. If word-final intrusive-*r* has become an established phonological feature, it may have settled down so that it tends to be produced whenever the broad context (intervocalic hiatus)

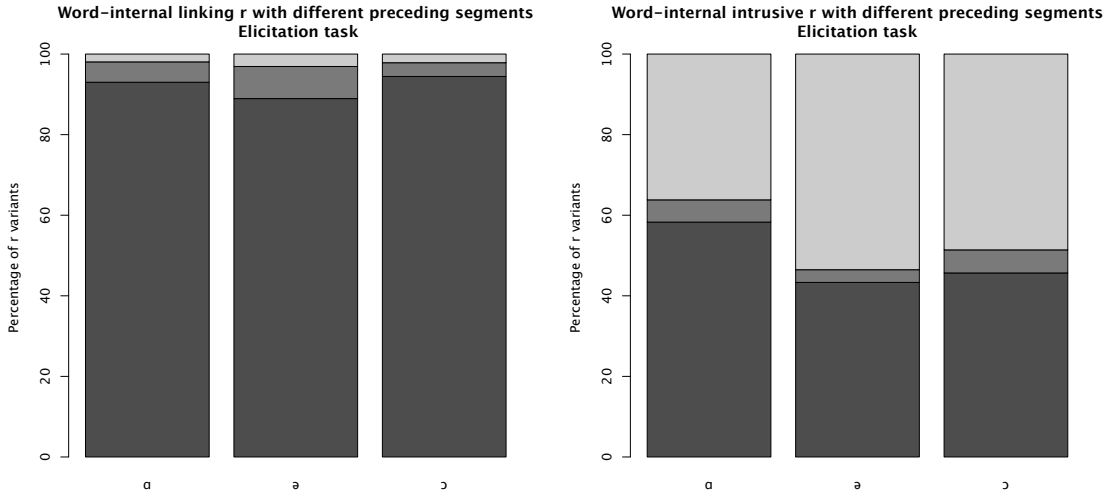


Figure 5.49
Elicitation task data, linking and intrusive-*r* by preceding segment for all speakers.

	ɑ	ə	ɔ
–	15	24	17
+	39	62	27
++	718	692	747
Total	772	778	791

Table 5.25
Raw figures for elicitation task data, word-internal linking-*r* by preceding segment. (χ^2 = 19, d.f. = 4, $p < 0.001$).

is satisfied; word-internal intrusive-*r* could still be at a much less secure stage, so that even if the broad phonological context is met, it is still influenced by more specific contexts: specific preceding vowels. If this idea is correct, it would support the chronology proposed by Hay & Sudbury (2005: 817) that word-final intrusive-*r* may develop before word-internal intrusive-*r*: '[i]ntrusive /r/ across word-external boundaries almost certainly predated its emergence across word-internal morpheme boundaries by a significant degree'.

5.8.5 Elicitation task data for preceding segment

The elicitation task generates word-internal tokens. The distribution of linking and intrusive-*r* in these word-internal contexts can be displayed and its significance tested in the same way as for the sentences task data. Figure 5.49 shows the word-internal distributions of linking and intrusive-*r* in the elicitation task data; the raw figures are given in Tables 5.25 and 5.26.

In the elicitation task data, the distributions of both word-internal linking-*r* and word-internal intrusive-*r* are significant with respect to preceding segment. This could be a result of the higher token counts (the elicitation task generated a lot of tokens in controlled contexts); it could also

	ɑ	ə	ɔ
–	203	509	382
+	31	30	45
++	327	412	359
Total	561	951	786

Table 5.26
Raw figures for elicitation task data, word-internal intrusive-*r* by preceding segment. (χ^2 = 47.7, d.f. = 4, p = 0).

be a result of a change in behaviour between the sentences task and the elicitation task. However, as the results stand, the elicitation task data suggest that preceding segment plays a significant role in conditioning the production of both linking and intrusive-*r*.

5.9 Influence on intrusive-*r* production of the presence of /r/ in the base in the elicitation task data

One set of the place names used as bases for suffixation in the elicitation task consists of place names ending in schwa, e.g. *Locka*, *Banna*. I also gathered data on the suffixation after two bases that contain an /ɹ/ in the stem: *Gretna* and *Middlesbrough*. In the case of *Middlesbrough* [mɪdəlzbɹə], production of intrusive-*r* would result in a segmental sequence [ɹəɹ]. Hall (2007: 2) argues that English has a 'process of short-distance /ɹ/-dissimilation, in which the structure [rər] is avoided by a variety of means'. This suggests that intrusive-*r* could be less likely to be produced in suffixed forms based on *Middlesbrough* than on suffixed forms using other schwa-final bases. In addition, it has been argued (Hay & Drager 2007, Hall 2007, Heid & Hawkins 2000) that there are longer-range resonance effects concerning *r* which may affect perception and production. In *Gretna*, the /ɹ/ is in the onset of the syllable preceding the site of potential *r*-intrusion in a suffixed form such as *Gretna-ish*, yet this too could have an effect on the likelihood of intrusive-*r* production.

I compared the realisations of intrusive-*r* after *Middlesbrough* to those after the bases without /ɹ/; the results are presented in Figure 5.50 with the raw token counts in Table 5.27. *Middlesbrough* actually seems more likely to be followed by an intrusive-*r* than are bases without /ɹ/, but this distribution is not quite significant at the 0.05 level.

The results for *Gretna* are given Figure 5.51 with the raw token counts in Table 5.28. Here, bases without /ɹ/ are less likely to lead to production of intrusive-*r* than *Gretna* is; this time the distribution is significant. This suggests that the presence of /ɹ/ near to a site of potential intrusive-*r* does have an effect on the likelihood of production of the intrusive-*r*.

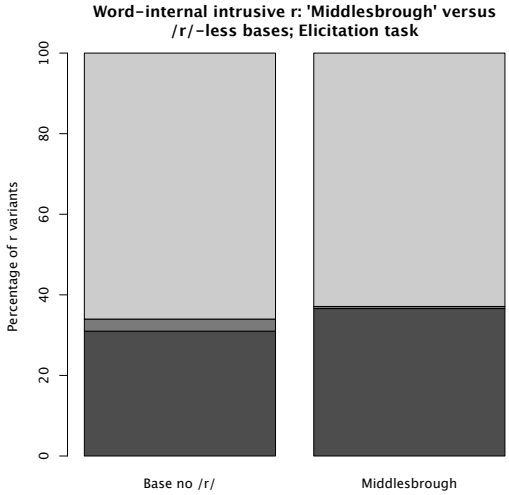


Figure 5.50
Elicitation task data, word-internal intrusive-*r*, *Middlesbrough* versus other schwa-final bases.

	Base no /r/	*Middlesbrough*
–	505	122
+	23	1
++	237	71
Total	765	194

Table 5.27
Raw figures for elicitation task data, word-internal intrusive-*r*, *Middlesbrough* versus other schwa-final bases. (χ^2 = 5.6, d.f. = 2, p = 0.06).

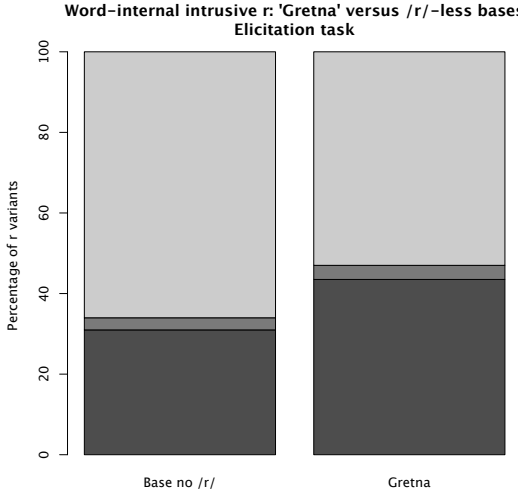


Figure 5.51
Elicitation task data, word-internal intrusive-*r*, *Gretna* versus other schwa-final bases.

	Base no /r/	*Gretna*
–	505	106
+	23	7
++	237	87
Total	765	200

Table 5.28
Raw figures for elicitation task data, word-internal intrusive-*r*, *Gretna* versus other schwa-final bases. (χ^2 = 11.8, d.f. = 2, p = 0.003).

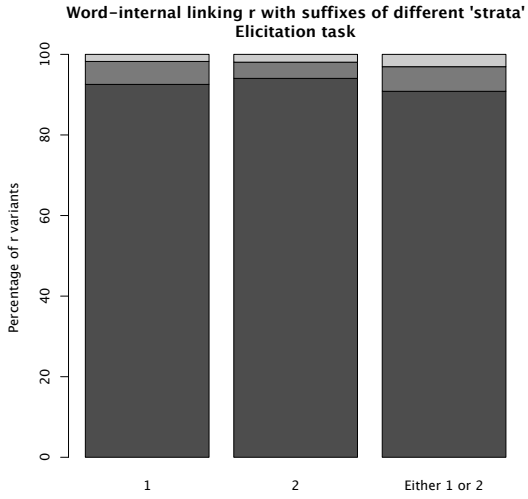


Figure 5.52
Elicitation task data, word-internal linking-*r* by stratum of suffix.

5.10 Influence of 'stratum' of suffix in the elicitation task data

The elicitation task generated tokens of word-internal linking and intrusive-*r* resulting from adding various suffixes to a range of place names. The suffixes were selected to ensure a balance between what are sometimes labelled 'level one' or 'stratum one' suffixes (in this case -IC and -IAN), and level/stratum two suffixes (here -ISH and -Y), with the remaining suffixes (-ER, -ESQUE and -ISE) potentially fitting on either level. Although there has been debate about whether the affix or the base drives certain morphophonological processes (see Giegerich 1999), the two levels of affix are typically associated with different morphophonological patterns: for example, the two 'stratum one' suffixes I selected (-IC and -IAN) often cause stress-shifting, while -ISH and -Y do not. I compared the realisations of linking-*r* across these different categories of suffix, and the results are presented in Figure 5.52 with the raw token counts in Table 5.29. As can be seen in Table 5.29, the tokens of linking-*r* are not significantly distributed across the different lexical strata of the suffixes.

	1	2	Either 1 or 2
–	12	13	31
+	40	27	62
++	634	631	921
Total	686	671	1014

Table 5.29
Raw figures for elicitation task data, word-internal linking-*r* by stratum of suffix. (χ^2 = 7.5, d.f. = 4, p = 0.11).

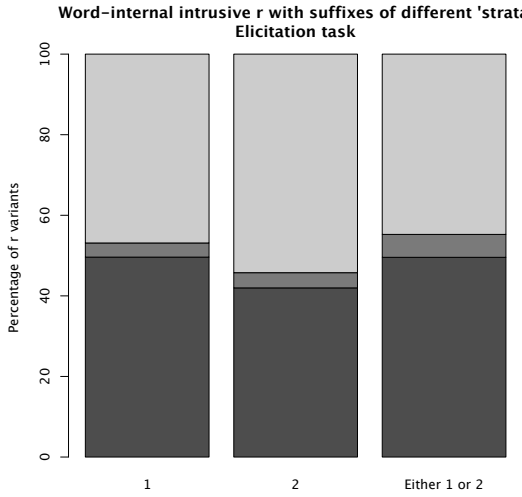


Figure 5.53
Intrusive task data, word-internal intrusive-*r* by stratum of suffix.

	1	2	Either 1 or 2
–	307	345	464
+	23	24	59
++	326	267	514
Total	656	636	1037

Table 5.30
Raw figures for elicitation task data, word-internal intrusive-*r* by stratum of suffix. (χ^2 = 18.6, d.f. = 4, p = 0.001).

The same analysis was carried out for word-internal intrusive-*r*, as seen in in Figure 5.53 with the raw token counts in Table 5.30. The tokens of intrusive-*r* are significantly distributed across the different lexical strata of the suffixes (χ^2 = 18.6, d.f. = 4, p = 0.001). As it stands though, this statistic does not give any information about the potential cause of this significant distribution of tokens, or whether there is a causal link between certain types of suffix and the likelihood of intrusive-*r* being produced. The distribution of tokens represented in Figure 5.52 suggests that stratum one suffixes in intrusive contexts are more likely to lead to realisation of a surface rhotic than are stratum two suffixes. I will return to the question of suffix strata in Section 5.11.5 below concerning multivariate analyses.

So far I have considered individual factors: place, age group, preceding segments, stratum of suffix, correlations between rhoticity and *r*-sandhi. The next step is to consider multivariate analyses of the datasets from the three tasks to see how these factors may interact in conditioning the production of *r*-sandhi.

5.11 Multivariate analysis in detail

The multivariate analyses discussed in Section 5.3 were arrived at after many recodings of the data set in order to establish the best model of factors influencing the production of *r* in coda, linking and intrusive contexts. So far, I have referred to the evidence for a task-style effect in the two sandhi datasets, and the lack of a style effect in the dataset for coda-*r*. Here I discuss the other factors retained in the multivariate analyses.

*5.11.1 Multivariate analysis of coda-*r

For convenience, I repeat the results: Figure 5.54 shows the multivariate analysis of coda-*r*. Task style was included in the analysis, but was not retained as significant in the model.

The first factor was the random effect of individual speaker variation. The fixed factors were added in the following order.

Preceding segment was added to the model first. Rather than consider the set of individual preceding segments, which were not retained as significant, I recoded them into a two-way distinction between back and non-back vowels. Preceding back vowels favour the realisation of coda-*r*; non-back vowels disfavour its production. This conclusion matches my impressionistic response while transcribing the speech of my more rhotic speakers that preceding /ɑ/ and /ɔ/ led to particularly 'rhotic' sounding realisations. Non-back vowels, including [ə] disfavoured the realisation of surface *r*.

The possibilities for a following segment for coda-*r* tokens are either a consonant or a pause. A following pause favoured the realisation of coda-*r*: effectively, this means that phrase-final tokens tend to favour realisation of coda-*r*. The 'following consonant' category includes both coda clusters such as *bard* and word-final tokens in connected speech immediately followed by a consonant-initial word.

The morphological boundary was retained as significant. Here, the most strongly favouring context is where there is no boundary (coda clusters in monomorphemes such as *bard*). I coded

```
CODA-R

BEST STEP-UP MODEL WAS WITH SpeakerID (random) + PrecedingSegBackness
(1.18e-154) + FollowingSeg (4.56e-63) + MorphBoundary (2.88e-20) +
Place (1.77e-09) + SimpleStress (7.82e-07) + AgeGroup (0.000142) [A]

STEP-UP AND STEP-DOWN MATCH!
STEPPING DOWN:
$PrecedingSegBackness
  factor logodds tokens r/r+0 centered factor weight
    Back   0.668   3729 0.345                 0.661
 NonBack  -0.668   9642 0.172                 0.339

$FollowingSeg
 factor logodds tokens r/r+0 centered factor weight
  PAUSE   0.642   2822 0.299                 0.655
      C  -0.642  10549 0.199                 0.345

$MorphBoundary
         factor logodds tokens r/r+0 centered factor weight
 Not Applicable   0.405   4410 0.262                   0.6
              M   0.303   1359 0.182                 0.575
              W  -0.002   7207 0.210                   0.5
         Clitic  -0.706    395 0.078                  0.33

$Place
      factor logodds tokens r/r+0 centered factor weight
 2Rossendale   2.524   2781 0.528                 0.926
 1Accrington   1.589   2786 0.349                  0.83
 3Ramsbottom  -0.322   2317 0.148                  0.42
       4Bury  -1.400   2736 0.045                 0.198
  5Prestwich  -2.391   2751 0.015                 0.084

$SimpleStress
 factor logodds tokens r/r+0 centered factor weight
      S   0.177   7089 0.271                 0.544
      U  -0.177   6282 0.162                 0.456

$AgeGroup
 factor logodds tokens r/r+0 centered factor weight
      O   0.588   6938 0.257                 0.643
      Y  -0.588   6433 0.180                 0.357


$misc
 deviance df intercept grand mean centered input prob
  8894.66 13    -1.866       0.22               0.134


Current variables are:
response.binary: Realisation_r (r vs. 0)
fixed.factor: MorphBoundary Place AgeGroup TaskStyle SimpleStress
PrecedingSegBackness FollowingSeg
random.intercept: SpeakerID

Random (cross speaker) standard deviation (log odds) 0.696
```

Figure 5.54
Coda-*r* multivariate analysis.

clitics separately (so 'the *bar's* always busy' was distinguished from 'there are five *bars* on the gate'), and clitics seem to disfavour realisation of coda-*r*.

The three factors added to the model first were all internal linguistic factors; it is only after preceding segment, following segment and morphological boundary were added to the model that an external factor, place, was added. Here Rossendale most strongly favours realisation of coda-*r*, followed by Accrington. Ramsbottom, Bury and Prestwich disfavour realisation of coda-*r*, in that order. This matches very closely the distributional analysis of rhoticity across the five places in the survey, as discussed in Section 5.4.

The coding for 'stress' in my transcription was a combination of lexical stress and phrasal prominence, to allow for labelling of 'mixed' examples. For instance, this system allows for description of tokens in a lexically stressed position which happened to arise in a position in the utterance which was not emphasised. However, for the multivariate analysis I collapsed this coding system to a two-way distinction of phrasal 'stress': U(nstressed) versus S(tressed). This distinction was retained in the model, with stressed tokens favouring the realisation of coda-*r*.

The final factor retained in the model for coda-*r* is the age group of the speaker: older speakers favour the production of coda-*r*, younger speakers disfavour the production of coda-*r*. While this matches the overall distribution of rhoticity in the apparent time comparison discussed earlier, it is a generalisation across all the speakers in the dataset. If only Rossendale speakers are considered, then younger speakers actually have a slightly increased rate of rhoticity (see Figure 5.8).

*5.11.2 Multivariate analysis of linking-*r

Figure 5.55 shows the multivariate analysis of linking-*r*. In the linking-*r* model the following segment was not retained as a significant factor; all other factors were retained in the model, and were added as follows. The random effect of individual speaker variation was added first.

The morphological boundary was added next. Word-internal morpheme boundary position strongly favours the realisation of linking-*r*; word-final position disfavours the production of linking-*r*. This is logical, bearing in mind the lack of variation in linking-*r* in word-internal positions across the data.

Next the task-style was added to the model. Conversational speech favours the production of linking-*r*, whereas the sentence and elicitation tasks disfavour the production of linking-*r*. This is intuitive, considering that spontaneous natural connected speech is more likely to lead to sandhi

```
LINKING-R

BEST STEP-DOWN MODEL IS WITH SpeakerID (random) + MorphBoundary (2.54e-45) +
TaskStyle (2.87e-45) + PrecedingSegBackness (1.73e-07) + SimpleStress
(0.00372) + AgeGroup (0.00409) + Place (0.00724) [D]

$MorphBoundary
 factor logodds tokens r/r+0 centered factor weight
      M   1.543   2993 0.978                  0.824
      W  -1.543   3025 0.871                  0.176

$TaskStyle
       factor logodds tokens r/r+0 centered factor weight
 Conversation   1.254   2558 0.925                  0.778
    Sentences  -0.450   1083 0.809                  0.389
  Elicitation  -0.804   2377 0.976                  0.309

$PrecedingSegBackness
   factor logodds tokens r/r+0 centered factor weight
     Back   0.415   2277 0.960                  0.602
 Non-back  -0.415   3741 0.903                  0.398

$SimpleStress
 factor logodds tokens r/r+0 centered factor weight
      U   0.184   2910 0.914                  0.546
      S  -0.184   3108 0.934                  0.454

$AgeGroup
 factor logodds tokens r/r+0 centered factor weight
      O   0.279   3250 0.937                  0.569
      Y  -0.279   2768 0.910                  0.431

$Place
      factor logodds tokens r/r+0 centered factor weight
 2Rossendale   0.556   1144 0.955                  0.635
       4Bury   0.275   1254 0.940                  0.568
 1Accrington   0.003   1254 0.927                  0.501
 3Ramsbottom  -0.306   1069 0.910                  0.424
  5Prestwich  -0.528   1297 0.891                  0.371

$misc
 deviance df intercept grand mean centered input prob
 2644.486 12     3.098      0.924               0.957
Random (cross speaker) standard deviation (log odds) 0.393
STEP-UP AND STEP-DOWN MATCH!

Current variables are:
response.binary: Realisation_r (r vs. 0)
fixed.factor: MorphBoundary PrecedingSegBackness FollowingSegBackness Place
AgeGroup TaskStyle SimpleStress
random.intercept: SpeakerID
```

Figure 5.55
Linking-*r* multivariate analysis.

environments. The slower, more careful speech associated with reading styles may introduce intonation breaks and pauses which remove some of the potential sandhi environments; those that are left may still be articulated in a careful, precise speech style which would mitigate against connected speech phenomena such as linking-*r*. It is interesting that the elicitation task disfavours the production of linking-*r*, given that the tokens from this task are by definition word-internal, and word-internal positions strongly favour realisations of linking-*r*. Nonetheless, in the model of the data as a whole, the two non-spontaneous speech styles disfavour the production of linking-*r*.

The nature of the preceding segment was added to the model next. As with coda-*r*, preceding back-vowels favour realisation of linking-*r*, and preceding non-back vowels disfavour production of linking-*r*.

The simplified 'stress' factor was added next, and this time the two levels of the factor (S and U) apply in a mirror-image to their influence in production of coda-*r*. Here, a preceding unstressed syllable favours realisation of linking-*r*and a preceding stressed syllable disfavours the realisation of linking-*r*.

The final two factors to be added to the model are external factors. Age group is significant, with older speakers favouring production of linking-*r*, while younger speakers disfavour its production. Place is added last, with Rossendale, Bury and Accrington favouring realisation of linking-*r*, while Ramsbottom and Prestwich disfavour realisation of linking-*r*. Prestwich speakers were the least rhotic, so if there is a link between level of rhoticity and level of linking-*r*, then it makes sense that they disfavour linking-*r*. However, given the consistent non-rhoticity in older and younger speakers in Prestwich, I would expect *r*-sandhi to be well established there (as opposed to the more variable situation in other places in the survey), in which case I would expect Prestwich speakers to favour the production of linking-*r*. Perhaps the results in Figure 5.54 suggest that there is a relationship between level of rhoticity and level of linking-*r*, and that even the Prestwich speakers have not yet gone through a process of reanalysis or rule inversion: they are still operating with a phonological system in which lower levels of rhoticity lead to a disfavouring of linking-*r*.

*5.11.3 Multivariate analysis of intrusive-*r

Figure 5.56 shows the multivariate analysis of intrusive-*r*. In this model, following segment and speaker age group were not retained as significant factors in the realisation of intrusive-*r*. After the random effect of individual speaker variation was added to the model, the remaining fixed factors were added as follows.

The task style was significant, with the conversation and elicitation tasks favouring production of intrusive-*r*, and the sentences task disfavouring production of intrusive-*r*. As discussed in relation to linking-*r*, it is unsurprising that a careful, reading speech style should disfavour a sandhi phenomenon such as intrusive-*r*. It is equally logical that spontaneous casual conversational connected speech should favour intrusive-*r*. It is interesting that the elicitation task also favours production of intrusive-*r*. To me this suggests that, at least with respect to intrusive-*r*, the

```
INTRUSIVE-R

BEST STEP-DOWN MODEL IS WITH SpeakerID (random) + TaskStyle (5.78e-16) +
PrecedingSeg (5.19e-14) + MorphBoundary (4.11e-11) + Place (0.0197) +
SimpleStress (0.04) [D]
STEP-UP AND STEP-DOWN MATCH!

$TaskStyle
       factor logodds tokens r/r+0 centered factor weight
 Conversation   0.628    198 0.333                  0.652
  Elicitation   0.167   2311 0.524                  0.542
    Sentences  -0.795    720 0.265                  0.311

$PrecedingSeg
 factor logodds tokens r/r+0 centered factor weight
      ɑ   1.057    730 0.562                  0.742
      ɔ   0.393    974 0.453                  0.597
      ɜ  -0.027     16 0.312                  0.493
      ə  -0.331   1382 0.429                  0.418
      ɛ  -1.092    127 0.157                  0.251

$MorphBoundary
 factor logodds tokens r/r+0 centered factor weight
 Clitic   1.472     24 0.625                  0.813
      M  -0.177   2609 0.505                  0.456
      W  -1.295    596 0.228                  0.215

$Place
      factor logodds tokens r/r+0 centered factor weight
  5Prestwich   1.484    674 0.690                  0.815
       4Bury   0.991    702 0.598                  0.729
 1Accrington  -0.633    676 0.314                  0.347
 3Ramsbottom  -0.644    536 0.325                  0.344
 2Rossendale  -1.198    641 0.309                  0.232

$SimpleStress
 factor logodds tokens r/r+0 centered factor weight
      U   0.346   1424 0.435                  0.586
      S  -0.346   1805 0.470                  0.414

$misc
 deviance df intercept grand mean centered input prob
 3094.282 15    -0.293      0.455               0.427

Random (cross speaker) standard deviation (log odds) 1.475

Current variables are:
response.binary: Realisation_r (r vs. 0)
fixed.factor: MorphBoundary PrecedingSeg FollowingSegBackness Place AgeGroup
TaskStyle SimpleStress
random.intercept: SpeakerID
```

Figure 5.56
Intrusive-*r* multivariate analysis.

elicitation task may have been causing some speakers to produce intrusive-*r* more frequently than they do in 'normal' connected speech, whether that be conversational speech or reading full sentences. In particular, the results of the multivariate analysis match the tendency for some speakers to have higher rates of *r*-intrusion in the elicitation task than in the sentences task (see Figure 5.38).

The preceding segment was significant. Here, because there was a small set of potential preceding vowels, I did not collapse the category into back versus non-back, but kept the individual vowels separate. However, as can be seen, preceding [ɑ] and [ɔ] favour realisation of

intrusive-*r*, whereas preceding [ɜ], [ə] and [ɛ] disfavour its production: the model has effectively distinguished between back and non-back preceding vowels.

Morphological boundary was added to the model next. Again, I coded clitics separately from morpheme boundaries and word boundaries, and the model suggests that clitics favour the production of intrusive-*r*, whereas other boundary positions disfavour its production. However, this finding should be approached with some caution: there are vastly fewer tokens in the clitic category than in the other categories, and the category consists of one repeated example in the sentences task: *Emma'll be here soon*. The relative ranking of morpheme boundary position and word boundary position is also surprising here: I would expect word boundary position to favour intrusive-*r* more than morpheme boundary (so *law[r] and order* more than *draw[r]ing*), yet here the ranking is the other way round. Perhaps there is an interaction with task style, given that the elicitation task produced only word-internal morpheme boundary tokens.

Place was added next, with Prestwich and Bury favouring production of intrusive-*r*, while Accrington, Ramsbottom and Rossendale disfavour production of intrusive-*r*. If the hypothesis that there is a correlation between level of rhoticity and level of intrusive-*r* is correct then this is logical (cf. Figure 5.54 for the ranking of places in the multivariate model of production of coda-*r*).

Finally, the simplified 'stress' factor was added to the model, and as with linking-*r*, it seems that unstressed positions favour production of intrusive-*r* while stressed positions disfavour its production.

5.11.4 Alternative models including level of rhoticity as a factor

A key question in this research is the link between rhoticity and *r*-sandhi. With this in mind, I ran additional multivariate analyses of linking-*r* and intrusive-*r* where I coded each token for the level of rhoticity of the speaker. This approach was also taken by Hay & Sudbury (2005), who found that the level of rhoticity was a significant factor in the production of *r*-sandhi. Figure 5.57 shows a multivariate analysis of linking-*r*, this time including level of rhoticity as a factor. Here, the step-up and step-down logistical regression models do not match. The step-down model does not retain level of rhoticity as a significant factor; the step-up model does retain level of rhoticity, but does not retain place in the model. This suggests that the two factors of level of rhoticity and place have an interaction rather than being independent factors conditioning

```
LINKING-R INCLUDING LEVEL OF RHOTICITY

BEST STEP-DOWN MODEL IS WITH SpeakerID (random) + MorphBoundary (2.54e-45) +
TaskStyle (2.87e-45) + PrecedingSegBackness (1.73e-07) + SimpleStress
(0.00372) + AgeGroup (0.00409) + Place (0.00724) [D]

$MorphBoundary
 factor logodds tokens r/r+0 centered factor weight
      M   1.543   2993 0.978                  0.824
      W  -1.543   3025 0.871                  0.176

$TaskStyle
       factor logodds tokens r/r+0 centered factor weight
 Conversation   1.254   2558 0.925                  0.778
    Sentences  -0.450   1083 0.809                  0.389
  Elicitation  -0.804   2377 0.976                  0.309

$PrecedingSegBackness
   factor logodds tokens r/r+0 centered factor weight
     Back   0.415   2277 0.960                  0.602
 Non-back  -0.415   3741 0.903                  0.398

$SimpleStress
 factor logodds tokens r/r+0 centered factor weight
      U   0.184   2910 0.914                  0.546
      S  -0.184   3108 0.934                  0.454

$AgeGroup
 factor logodds tokens r/r+0 centered factor weight
      O   0.279   3250 0.937                  0.569
      Y  -0.279   2768 0.910                  0.431

$Place
      factor logodds tokens r/r+0 centered factor weight
 2Rossendale   0.556   1144 0.955                  0.635
       4Bury   0.275   1254 0.940                  0.568
 1Accrington   0.003   1254 0.927                  0.501
 3Ramsbottom  -0.306   1069 0.910                  0.424
  5Prestwich  -0.528   1297 0.891                  0.371

$misc
 deviance df intercept grand mean centered input prob
 2644.486 12     3.098      0.924              0.957
Random (cross speaker) standard deviation (log odds) 0.393


BEST STEP-UP MODEL WAS WITH SpeakerID (random) + MorphBoundary (1.01e-62) +
TaskStyle (5.71e-42) + PrecedingSegBackness (1.22e-05) + SimpleStress
(0.00295) + LevelOfRhoticity (0.00368) [A]

STEP-UP AND STEP-DOWN MISMATCH!!
```

Figure 5.57
Linking-*r* multivariate analysis, including level of rhoticity.

the production of linking-*r*. This is quite expected given the strong links between place and distribution of realised coda-*r* discussed earlier.

Figure 5.58 shows a multivariate analysis of intrusive-*r*, this time including level of rhoticity as a factor. Here, including level of rhoticity in the regression causes place not to be retained in the model. This time the step-up and step-down regressions match, so although there is clearly a link between level of rhoticity and place, in this model, level of rhoticity turns out to be the more significant contributor to the distribution of intrusive-*r*. The levels of the 'levels of

```
INTRUSIVE-R INCLUDING LEVEL OF RHOTICITY

BEST STEP-DOWN MODEL IS WITH SpeakerID (random) + TaskStyle (5.17e-16) +
PrecedingSeg (4.24e-14) + MorphBoundary (4.35e-11) + LevelOfRhoticity
(0.000263) + SimpleStress (0.0424) [D]

$TaskStyle
       factor logodds tokens r/r+0 centered factor weight
 Conversation   0.631    198 0.333                  0.653
  Elicitation   0.165   2311 0.524                  0.541
    Sentences  -0.796    720 0.265                  0.311

$PrecedingSeg
 factor logodds tokens r/r+0 centered factor weight
      ɑ   1.060    730 0.562                  0.743
      ɔ   0.393    974 0.453                  0.597
      ɜ  -0.030     16 0.312                  0.493
      ə  -0.323   1382 0.429                   0.42
      ɛ  -1.099    127 0.157                   0.25

$MorphBoundary
 factor logodds tokens r/r+0 centered factor weight
 Clitic   1.466     24 0.625                  0.812
      M  -0.174   2609 0.505                  0.457
      W  -1.292    596 0.228                  0.216

$LevelOfRhoticity
              factor logodds tokens r/r+0 centered factor weight
           UnderFive   1.346   1238 0.611                  0.794
       FiveToFifteen   1.318    587 0.612                  0.789
      OverThirtyFive  -0.596    984 0.314                  0.355
 FifteenToThirtyFive  -2.068    420 0.105                  0.112

$SimpleStress
 factor logodds tokens r/r+0 centered factor weight
      U   0.342   1424 0.435                  0.585
      S  -0.342   1805 0.470                  0.415

$misc
 deviance df intercept grand mean centered input prob
   3086.9 14    -0.542      0.455               0.368

STEP-UP AND STEP-DOWN MATCH!

Current variables are:
response.binary: Realisation_r (r vs. 0)
fixed.factor: MorphBoundary PrecedingSeg FollowingSegBackness Place AgeGroup
TaskStyle SimpleStress LevelOfRhoticity
random.intercept: SpeakerID

Random (cross speaker) standard deviation (log odds) 1.287
```

Figure 5.58
Intrusive-*r* multivariate analysis, including level of rhoticity.

rhoticity' factor follow a logical pattern in terms of their influence on intrusive-*r* production. If the speaker is under 5% rhotic, or between 5% and 15% rhotic, then intrusive-*r* is favoured; if the speaker is 15% to 35% rhotic or over 35% rhotic then intrusive-*r* is disfavoured. There is a slightly curious effect, such that the intermediate 15% to 35% rhotic category more strongly disfavours intrusive-*r* than the most strongly rhotic over 35% category.

```
ELICITATION TASK WORD-INTERNAL INTRUSIVE-R

BEST STEP-DOWN MODEL IS WITH SpeakerID (random) + PrecedingSeg (5.88e-18) +
Stratum (0.00587) + FollowingSeg (0.0185) + Place (0.0437) [D]

$PrecedingSeg
 factor logodds tokens r/r+0 centered factor weight
      ɛ  15.512      8 1.000                >0.999
      ɑ   1.440    561 0.638                 0.808
      ɔ   0.724    786 0.514                 0.673
      ə   0.302    951 0.465                 0.575
      a  -2.705     22 0.045                 0.063
      ɜ -15.271      1 0.000                <0.001

$Stratum
     factor logodds tokens r/r+0 centered factor weight
 Either1or2   0.282   1037 0.553                  0.57
          1   0.070    656 0.532                 0.517
          2  -0.352    636 0.458                 0.413

$FollowingSeg
 factor logodds tokens r/r+0 centered factor weight
      e   3.035      3 0.333                  0.954
     aɪ   2.289    213 0.629                  0.908
      i   2.054    346 0.526                  0.886
      ɛ   2.039    355 0.561                  0.885
      ɪ   2.019   1064 0.488                  0.883
      ə   1.779    344 0.517                  0.856
      ɜ -13.215      4 0.000                <0.001

$Place
      factor logodds tokens r/r+0 centered factor weight
  5Prestwich   1.580    484 0.775                  0.829
       4Bury   0.984    512 0.645                  0.728
 1Accrington  -0.670    463 0.395                  0.338
 3Ramsbottom  -0.726    401 0.354                  0.326
 2Rossendale  -1.169    469 0.390                  0.237

$misc
 deviance df intercept grand mean centered input prob
 2158.399 19    -2.857      0.521               0.054

BEST STEP-UP MODEL WAS WITH SpeakerID (random) + PrecedingSeg (6.56e-17) +
Stratum (2.55e-05) + FollowingSeg (0.0192) + Place (0.0437) [A]
Random (cross speaker) standard deviation (log odds) 1.689

STEP-UP AND STEP-DOWN MATCH!
```

Figure 5.59
Intrusive-*r* multivariate analysis, including stratum of suffix.

5.11.5 Multivariate analysis of elicitation task data including stratum of suffix

By carrying out a multivariate analysis of a subsection of the data to include only the elicitation task, I investigated the finding that the variants of intrusive-*r* were significantly distributed across sandhi contexts involving suffixes of different lexical strata (see Section 5.10). Figure 5.59 shows a multivariate analysis of elicitation task word-internal intrusive-*r*, this time including stratum of suffix as a factor.

The results here support the finding that in cases where adding a suffix creates a hiatus sandhi environment, the stratum of the suffix does significantly affect the production of intrusive-*r*. Indeed, after the random effect of individual speaker variation is accounted for, the suffix-stratum

is the second fixed factor added to the model after the preceding segment. The ranking of the different strata suggests that 'stratum 2' suffixes disfavour production of intrusive-*r*, whereas 'stratum 1' (and those suffixes which could be argued to be either stratum 1 or 2) favour production of intrusive-*r*. This finding will be examined in Chapter 7 where I discuss the phonological patterns in my data. However, for the moment I note that one feature of the stratum 1 suffixes in the elicitation task is that they can cause stress shifting (consider *Bolton*, *Boltonic*, *Boltonian*). In the global multivariate analyses of intrusive-*r* (Figures 5.56 and 5.58), stress was a significant factor; in the restricted elicitation task analysis, the inclusion of suffix-stratum as a factor lead to stress not being added to the model. This would suggest that there could be an interaction between suffix stratum and stress. However, in the earlier analyses, unstressed positions favoured production of intrusive-*r* and stressed positions disfavoured its production: here the pattern seems to be reversed. In addition, the expected stress-shifting was in practice not very frequent in my speakers' responses to the elicitation prompts. Many speakers would say *Boltonic* as [ˈboʊɬɑnɪk] rather than [bəɬˈtɒnɪk] for instance.

In order to verify the lack of significance in the distribution of linking-*r* tokens before suffixes of different strata, I carried out a multivariate analysis of the same elicitation task data, this time limiting it to tokens of linking-*r*. Figure 5.60 shows a multivariate analysis of elicitation task word-internal intrusive-*r*, this time including stratum of suffix as a factor. Rbrul was unable to add any fixed factors to the model: the only significant factor was the random effect of speaker variation. This provides further evidence that linking and intrusive-*r* pattern very differently in the data, and is again perhaps because every token of intrusive-*r* can be explained as a manifestation of the same process regardless of the rhoticity of the speaker (even if it would be unexpected for rhotic speakers to have such a process). In contrast, tokens of surface linking-*r* could be motivated by different processes depending on whether the speaker is rhotic or not.

5.11.6 Summary of multivariate analyses of rhoticity and r*-sandhi*

The multivariate analyses support the hypothesis that there is a correlation between level of rhoticity and level of *r*-sandhi, and that speakers with high rhoticity/low *r*-sandhi or low rhoticity/high *r*-sandhi are distributed significantly across the different places in the sample. The analyses support the idea that different morphological boundaries affect the production of linking and intrusive-*r*. However, the discovery that word-final boundaries disfavour both linking and intrusive-*r* is unexpected. It may be an artefact of including the whole dataset in the analyses.

```
ELICITATION TASK WORD-INTERNAL LINKING-R

BEST STEP-DOWN MODEL IS WITH SpeakerID (random) + no fixed predictors () [D]

$SpeakerID
 random logodds tokens r/r+0 centered factor weight std dev
     30   0.815     87 1.000                  0.735   1.472
      8   0.810     86 1.000                  0.734   1.472
     22   0.805     85 1.000                  0.733   1.472
      6   0.799     84 1.000                  0.732   1.472
     12   0.799     84 1.000                  0.732   1.472
     16   0.799     84 1.000                  0.732   1.472
      2   0.794     83 1.000                  0.731   1.472
      7   0.794     83 1.000                  0.731   1.472
     15   0.794     83 1.000                  0.731   1.472
     27   0.794     83 1.000                  0.731   1.472
     19   0.789     82 1.000                   0.73   1.472
      1   0.783     81 1.000                  0.729   1.472
     28   0.783     81 1.000                  0.729   1.472
     29  -0.131     85 0.988                  0.519   1.472
      4  -0.139     84 0.988                  0.517   1.472
      9  -0.139     84 0.988                  0.517   1.472
     13  -0.139     84 0.988                  0.517   1.472
     20  -0.139     84 0.988                  0.517   1.472
     23  -0.147     83 0.988                  0.515   1.472
      3  -0.743     82 0.976                  0.369   1.472
     21  -0.743     82 0.976                  0.369   1.472
     17  -0.773     79 0.975                  0.362   1.472
      5  -0.927     65 0.969                  0.327   1.472
     11  -1.252     73 0.959                   0.26   1.472
     14  -1.951     79 0.924                  0.149   1.472
     10  -2.068     84 0.917                  0.135   1.472
     24  -2.210     85 0.906                  0.119   1.472
     26  -2.222     72 0.903                  0.118   1.472
     25  -2.653     80 0.862                   0.08   1.472

$misc
 deviance df intercept grand mean
  481.307  2     4.624      0.976


BEST STEP-UP MODEL WAS WITH SpeakerID (random) + no fixed predictors () [A]

STEP-UP AND STEP-DOWN MATCH!
Current variables are:
response.binary: Realisation_r (r vs. 0)
fixed.factor: PrecedingSeg FollowingSeg SimpleStress Place AgeGroup Stratum
random.intercept: SpeakerID
```

Figure 5.60
Linking-*r* multivariate analysis, including stratum of suffix.

The multivariate analyses suggest that there are differences between the tasks: conversational speech favours linking and intrusive-*r*, non-spontaneous speech usually disfavours production of *r*-sandhi. However, the elicitation task broadly favours production of intrusive-*r* in particular, and this may be a task-related effect. It would match the finding that some speakers produce higher levels of intrusive-*r* in the elicitation task than in the sentences task (see Section 5.7.5).

Preceding back segments ([ɑ, ɔ]) tend to favour production of linking and intrusive-*r*; preceding non-back segments ([ə, ɜ, ɛ]) tend to disfavour production of linking and intrusive-*r*. Again, the elicitation task data, when treated separately, produce slightly different results (see Figure 5.59). However, this is not representative of the data as a whole.

The stratum of the suffix that produces the sandhi context is also significant: suffixes that are 'stratum 2' and do not trigger stress-shifting disfavour the production of intrusive-*r* (an analysis of linking-*r* with the same factors leads to no fixed factors being retained as significant).

5.12 Summary and next steps

The results provide a detailed set of information about patterns in the data. Many of the reported patterns are statistically significant; where this is not the case this has been shown (figures for non-significant results have been included in this chapter). Even where some patterns are not statistically significant they may well be indicative of trends in the data.

My first four research questions have been answered in this chapter. The research questions are reprinted below, followed by a summary of the answers with reference to the results in this chapter.

(RQ1) What is the current dialectological distribution of rhoticity and *r*-sandhi in East Lancashire?

(RQ2) Do rhoticity and *r*-sandhi in East Lancashire vary with respect to social factors?

(RQ3) Do rhoticity and *r*-sandhi in East Lancashire vary with respect to linguistic context?

(RQ4) Do rhoticity and *r*-sandhi overlap in their distribution?

- **RQ1** There is apparent time evidence that the area of rhoticity has shrunk (see Section 5.4.2).
- **RQ1** There is apparent-time evidence that intrusive-*r* is spreading over a wider geographical area than used to be the case. This change is particularly dramatic in cases of word-internal intrusive-*r* (see Section 5.6.3).
- **RQ1** There is almost no evidence of hyper-rhoticity in the East Lancashire data (see Section 5.6.1).
- **RQ4** There is clear evidence that rhoticity and *r*-sandhi have an overlapping distribution, both geographically and in terms of the behaviour of individual speakers (see Tables 5.16 and 5.17).
- **RQ2** Word-internal linking-*r* shows virtually no variation in the data, with levels approaching 100% across the different localities and age groups (see Section 5.5.2).
- **RQ2** Word-final linking-*r* shows slight variation for the older speakers, bordering on being statistically significant. The difference between older Prestwich and older Rossendale

speakers is significant, and these groups had widely differing levels of rhoticity (see Section 5.5.3).

- **RQ1, RQ3, RQ4** Linking-*r* does not significantly correlate with rhoticity (see Section 5.7.2).
- **RQ1, RQ3, RQ4** Intrusive-*r* does significantly correlate with rhoticity (see Section 5.7.3).
- **RQ2, RQ3** Rhoticity is not subject to style-shifting (see Sections 5.7.4.1 and 5.11.1).
- **RQ2, RQ3** Linking and intrusive-*r* are subject to style-shifting across the three different data collection tasks (see Sections 5.11.2 and 5.11.3).
- **RQ3** The stratum of the suffix that causes a sandhi environment significantly affects the production of word-internal intrusive-*r* (see Section 5.10).
- **RQ3** The segment preceding a coda-*r*, linking-*r* or intrusive-*r* does significantly affect the production of *r*; in the cases of linking and intrusive-*r*, this depends on whether the site of *r*-sandhi is word-internal or word-final (see Section 5.8.4).

Chapter 6 addresses the questions of what these results say about dialectological variation and change in East Lancashire rhoticity and *r*-sandhi, and how this variation and change may be understood in the light of geographical space and socially constructed spatiality. Chapter 7 discusses what the results say about the phonology of rhoticity and *r*-sandhi.

Chapter 6

Dialectal and sociolinguistic variation and change

This chapter addresses RQ5: 'What implications do the East Lancashire data have for dialectology and sociolinguistics?' I begin by considering the geographical variation in my data.

6.1 Geographical factors affecting linguistic variation and change: SPACE and PLACE effects

A key feature in the design of this project is the inclusion of geographical location as a variable in the selection of participants. While this was an obvious research method in traditional dialectological projects covering multiple locations, such as the *SED*, sociolinguistic research on language variation and change has tended to focus on a particular location rather than multiple locations (Horvarth & Horvarth 2001: 37). This project differs from traditional dialectology, however. While dialectological surveys such as the *SED* typically involved data from speakers assumed to be speaking the most traditional local vernacular in each location, this project is designed to investigate variation within a sample of speakers from each population as well as variation across locations. This focus means that while I have different age groups of speakers in any given place in order to allow for an apparent time analysis of changes in rhoticity and *r*-sandhi in that place, by also being able to compare different places, I am able to investigate the movement of dialect boundaries through time and space. This is the same as the approach taken by Horvarth & Horvarth (2001: 54): '[i]f we can interpret linguistic patterns associated with age as the path of change over time, then we see no obstacle to interpreting the linguistic patterns among the localities as evidence of the change path over time as well'.

Horvarth & Horvarth make a useful distinction between the effects of *space* and *place* on linguistic variation: '[p]lace effects refer to the ensemble of sociolinguistic conditions within a speech locality, whereas space effects refer to the relationship between speech localities' (2001:

53). Clearly, these effects are linked and can work together in practice. If a particular locality is characterised in *place* terms by weak and sparse social networks (Milroy 1987: 20–1) and a lack of traditional social foci such as a local pub or village shop, these *place* factors may well be connected to the *space* factors of mass commuting to a neighbouring larger town to which people travel for work and leisure, visiting out of town cinema multiplexes and so on. However, the two sets of factors can vary in their influence in particular contexts: 'in some situations place effects may prevail with little or no significant space effects, and in other cases space effects prove to be significant' (Horvarth & Horvarth 2001: 53).

As explained in Section 4.4.1.1, the five locations for data collection were selected in order to control a set of potential geographical factors. They are approximately equally spaced in Cartesian terms, with about five miles between each place. They fall along a (more or less) straight line, which is a result of the local physical geography: the Irwell Valley. In 'space' terms then, this means that transport links exist (roads in the present day for journeys by private car and public transport, roads and railways in the first half of the twentieth century), and so movement between places and contact between speakers from these places is possible and likely. There are no physical barriers in the sense of mountain passes and so on. The five locations are progressively further away from the very large conurbation of Greater Manchester, so that if simple Cartesian distances are considered, the gravity model (Trudgill 1974: 233) would predict the influence of Manchester to be greatest on the nearest places and least on the furthest away places.

In 'place' terms the five localities cover a range of characteristics: Accrington is a former mill town that still maintains some manufacturing industry; Rossendale (covering the small towns of Rawtenstall and Haslingden) has essentially lost all of its traditional manufacturing industry, and residents talk of a general decline in its fortunes (a large retail development on the outskirts of Rawtenstall collapsed in its funding part way through construction and was an abandoned building site throughout the eighteen month period during which I was visiting the area and carrying out fieldwork). Ramsbottom has lost nearly all of its local industry (one paper mill remains), and although it is a self-sufficient small town with two supermarkets and a range of other shops and businesses, there is a large commuter population, which means that the older informants often mention a loss of the traditional feeling of community in Ramsbottom. Bury is a much larger town, which still has manufacturing industry, as well as employment in service

industries and in local government; Prestwich is a suburb of north Manchester: it is called a 'village', and although it does have a large supermarket, it is also characterised by the proximity of large roads (dual carriageways and motorways). The A56 main road into central Manchester runs right through Prestwich and there is a junction onto the M60 Manchester ring-road, both of which emphasise the ease with which (car-owning) people can commute for work and travel for leisure activities.

In 'space' terms, there are social factors such as the amount of commuter journeys between the five locations (see Section 6.1.2 below), and there is also a key *linguistic* 'space' factor: level of rhoticity. While it is possible for speakers in each of the places to vary in their rhoticity, the overall pattern involves spatial variation across the five locations. The northernmost location, Accrington, has been described as being on an 'island of rhoticity surrounded by urban and rural non-rhotic varieties' (Britain 2009: 135); Manchester speech is non-rhotic (Wells 1982: 368) and there was only very sporadic evidence of tokens of realised coda-*r* in my Prestwich data.

East Lancashire rhoticity, as it is distributed across the places in my survey, would be predicted to be under threat for two reasons. First, rhoticity would be predicted to be threatened because it is a feature which has been undergoing attrition in England for perhaps as long as 500 years (McMahon 2000: 238). Second, the 'space' effect of the proximity of the Greater Manchester conurbation (it is at most twenty-five miles from rhotic Accrington to non-rhotic central Manchester) would also be predicted to be a threat to East Lancashire rhoticity. Linguistic features have been shown to diffuse outwards from large urban centres (Trudgill 1974: 233). However, it is clear that simple Cartesian distances do not tell the whole story of how people from different dialect areas come into contact. The need to travel for work or leisure and the availability of transport are two potential influences on socially-constructed geographical space. If people from a further-away place find it easier or more necessary to travel to a city than do people from a nearer place, then the nature of the resulting dialect contact could lead to linguistic features leapfrogging over certain places, even if these are geographically nearer to the large city. Britain (2002b) shows how the availability of transport-links between towns in the Fens correlates with linguistic boundaries, and that even if two places are close together in Cartesian terms, if speakers do not come into contact with each other then there can still be a sharp linguistic isogloss between the places.

6.1.1 Impressionistic data on SPACE *variation*

There is impressionistic evidence in the interview data about the social forces at play for residents of East Lancashire in terms of their attitudes towards Manchester and their social practices. In the case of the younger speakers, the following four extracts demonstrate differing attitudes towards Manchester.

The younger Accrington speakers tended to have a local focus, describing what there is to do in Accrington itself (and frequently bemoaning the general lack of things to do in the town). However, they also indicate that they take part in shopping trips or nights out to larger urban areas such as Blackburn or Preston, and would like to spend time in Manchester if they could.

(6:1) **WB:** Where's the nearest . . . bigger city or bigger town?

Acc4: Blackburn, I'd say.

Acc5: Yeah . . . Preston.

Acc4: Preston and Blackburn. I was in Blackburn today . . . just because there *is* nowhere else to go.

. . .

Acc4: In an ideal world we would be in Manchester every day wouldn't we–

Acc5: Manchester

Acc4: or the Trafford Centre

Acc5: Leeds is good though. I enjoyed Leeds. Leeds was fun . . . but there's not many shops in Accy. New Look.

Acc4: What there used to be, it's now just pound shops and charity–

Acc5: Pound shops!

(Acc4&Acc5_Conversation.wav: 2:42–3:56)

Although Acc4 mentions a desire to spend time in Manchester 'in an ideal world', in practice the younger Accrington speakers focus on nearer (and smaller) urban centres.

Impressionistically, the younger Rossendale speakers were even more locally focused. Some of the younger Rossendale speakers do mention that they can get to larger towns or cities, but their stories of memorable nights out usually mentioned Rawtenstall, in part due to practicalities of transport.

(6:2) **WB:** So if you were living round here where would be the nearest place you could go out for a proper night out–

Ros10: Burnley . . . Burnley.

Ros11: Which is like . . . how long?

Ros10: About twenty minutes in a taxi? But like you can get a bus to Manchester. And then there's the last bus back which is like at half-eleven, and then you just go down Rawtenstall.

(Ros10_Ros11_Conversation.wav: 35:52–36:08)

The importance of being able to get the 'last bus back' was mentioned several times. While it would be too simplistic to claim a direct causal relation between this local focus and the young Rossendale speakers' high level of rhoticity, I think the young Rossendale speakers' comments are indicative of a generally 'local' trend. This means that the idea of younger Rossendale speakers potentially being representative of a new 'island of rhoticity' is not unexpected.

There is certainly a marked contrast in attitudes when my younger Ramsbottom speakers discuss their social practices. The attitude of one of the younger Ramsbottom speakers towards places further up the valley (and away from Manchester) is particularly clear. (HB is Ram17's housemate, who joined in the conversation).

(6:3) **HB:** I do a bit of work in Rawtenstall, and you find that the people there don't really go to Manchester very much.

WB: Really?

HB: Yeah they they go to Blackburn or Burnley . . . they don't really go to Manchester.

Ram17: Yeah! And if you speak to people and you say oh where do you go on a night out they'll say like Burnley or Blackburn and I'd be like . . . *God!* I would *never* go there on a night out!

HB: We're only a mile or two apart . . . Rawtenstall, but I've never–

Ram17: I would never ever go to Burnley on a night out!

WB: I mean . . . what do you reckon it'd be like?

Ram17: Oh it would be horrible! It would be horrible, yeah.

HB: It'd just be like Bury. It'd just be like Bury but a bit more . . . inbred.

(Ram17_Conversation.wav: 10:23–10:58)

Although there is clearly an element of intended humour in HB's comments about Burnley and Bury, it is notable that he draws attention to the small distance between Ramsbottom and Rossendale, and the much larger gulf in social practices in people from these two places.

Two of the young Prestwich speakers express clear views on their Mancunian status and their perception of rural valley-dwellers beyond Bury towards Ramsbottom:

(6:4) **Pre28:** People always argue that Prestwich isn't Manchester, but I don't know why cos it's a Manchester postcode, we're inside the ring road, and we're like IT IS! and they're like nah you're just pretending and we're just like how can we pretend when . . .

Pre29: Mmm. It's all about the ring road.

Pre28: It is! That's like the cut-off. Haha, up yours everywhere else!

Pre29: Oh that means that I'm not because I go over the motorway bridge so I'm over that–

Pre28: Yeah but . . . but . . . when they were doing the toll road –

Pre29: I was still in the . . .

Pre28: You were still in it because –

Pre29: I was in the second one

Pre28: Because you can only get . . . you can only get to Simister

Pre29: By that one route

Pre28: Via Prestwich. It is like a little . . . it's Simister island innit, but it's not even an island. What's going on there?

. . .

Pre29: But like as well, as you do get further away obviously from like Prestwich then you've got Bury, it is . . . hilly and you've got Ramsbottom and it's like massive hills and that in itself is like more rural than urban whereas I think Prestwich is, obviously cos it's closer you've got like the layers haven't you? Of like the Central Business District

Pre28: Urban sprawl again!

Pre29: Urban sprawl . . . [laughter] like the . . . *layout!* . . . That's not even a big word [laughter]

Pre28: Yeah. Outside the ringroad, that's where the hills are

Pre29: Yeah you've got the hills you've got like . . . sheep

Pre28: Here we've got man made hills . . . we've got man made green things

Pre29: You mean like our little parks? We've got like green what are they called?

Green belts. Oh my God it's all coming out! Mate! Get me involved in a masters in geography now!

Pre28: Yeah we've got to have the black soot and the city life, whereas they're like more–

Pre29: yeah country . . . *rrrrr!* [laughter] wondered what that was!

Pre28: WHAT? [laughter] That was like

Pre29: Farmer I was thinking

Pre28: FaRmer Giles

Pre29: Then again, yous all rip me because I'm from Simister and it's farm it's farm land there . . . It is . . . is Bury in Manchester? It's Greater Manchester innit?

Pre28: Greater Manchester. See that's my point, Greater Manchester is a made up place for people who want to be Mancunians but they're not! And are like 'I'm from Manchester ehhhh'

Pre29: Are we, are we like really. . .

Pre28: Mancs?

Pre29: Yeah.

Pre28: Yeah!

Pre29: Fair dos! Where . . . who am I? [laughter]

(Pre28_Pre29_Conversation.wav: 45:13–48:09)

It is interesting that these two Prestwich speakers use rhoticity as a marker of the rural status of people further up the Irwell Valley. Rhoticity is to some extent a national rural stereotype (based particularly on South West varieties of English), and given the content of the discussion in (6:4) and the use of the word *farmer* [faɪmɚ] in the stereotypical collocation *Farmer Giles*, that is probably how it is being used here. However, there is potentially a more local significance, in that people further up the Irwell Valley actually are more rhotic as well as being more rural. It is also interesting that, despite the protestations of Pre28 that Prestwich is definitely part of Manchester-proper, Pre29 still expresses some uncertainty about her 'Manc' status. Regardless, the desire of both speakers to positively self-identify as Mancunian is clear throughout the extract.

It may be that younger speakers in Ramsbottom, Bury and Prestwich all have a sociocultural focus on urban (non-rhotic) Manchester, while younger speakers in Accrington have an equivalent

urban focus towards Blackburn and Preston, and the aspiration to visit much larger cities such as Manchester or Leeds if they can. Such visits seem to be real high points: Acc5's visit to Leeds had taken place two weeks before the interview, and she was animated in describing the shopping opportunities available there, in contrast to those in Accrington. That would leave Rossendale speakers, who give the impression of being the most locally focussed. This was true of the younger speakers' own anecdotes, which tended to involve their local pub or the town centre; it was also shown in some comments by residents of Ramsbottom. There was also the following anecdote by Acc1, describing the relationship between Accrington and Rossendale several decades ago.

(6:5) **Acc1:** . . . talking about er local areas where people have different attitudes to each other because they're in different districts, me brother got engaged and married a girl from Rossendale and I can remember me dad saying 'She's from Waterfoot? They eat their young up there!' because it it was considered to be rather remote and and primitive you know that they would eat their children. 'They eat their young up there!' So there was sort of a rivalry between different districts I suppose . . .

The sense that some of my East Lancashire locations are socially remote comes across occasionally in media interviews. On 4 April 2010, Radio 4's *Bookclub* programme hosted by James Naughtie, featured Jeanette Winterson, who is from Accrington, discussing *Oranges Are Not The Only Fruit*, which is set there. When audience members were asking questions, the following exchange took place.

(6:6) **JN:** I think we've got somebody from Accrington here?

JW: No! How did you get out? Are you going back and if so why? [audience laughter]

This jokey reference to escaping from Accrington matches the responses of my participants who emphasise their lack of contact with people from other places.

(6:7) **Acc6:** I – I don't think I ever went to Manchester when I were younger . . . I don't think I ever went out of *Accrington* when I were younger . . . I have been since, like. (Acc6_Conversation.wav: 40:39–41:07)

However, there is clearly an ambiguous sense of place for at least some East Lancashire people. While the sense of Accrington as a repressive, insular place is evident in Jeanette Winterson's jokey comment, and indeed in the semi-autobiographical content of *Oranges Are Not The Only*

Fruit, there are also positive associations. The audience member asked about the level of local geographical detail in the novel and Winterson said: 'We've all got place located in us very deeply. When I still go back and I see those low looming Pennine ridges and that black stone it moves me as no other landscape does and I think we all have that experience of where we grew up'. This remark chimes with the sort of comments made by my younger and older speakers in Accrington and Rossendale particularly. While there was a sense that cities such as Manchester had more to offer than the local towns in terms of leisure and work opportunities, there was little sense that my participants would consider moving there.

(6:8) **Ros10:** I prefer to live here . . . I just can't live in a city or a town it's just too busy. I don't like it, it's just all people and they're all coming at you

Ros11: Our youngest sister she lives in Manchester now and she loves it, you know she doesn't like the country life, we –

Ros10: When we go we get headache though don't we!

Ros11: Yeah we get headache, changing– you know – the air

Ros10: The air's not as pure. That's what we say.

Ros11: We don't like it.

Ros10: It does though. We go once a year or so [laughter]

. . .

WB: It's not so far though is it?

Ros11: No. Half an hour.

Ros10: Took me fifteen minutes once –

Ros11: Fifteen minutes!

Ros10: That's when – No! That's when she was in labour and I were taking her to t'hospital . . .

(Ros10_Ros11_Conversation.wav: 2:32–3:21)

Although Ros10 is understating the frequency of her visits to Manchester for comic effect, the overall sense of a local focus is there, despite the close proximity of Manchester. This matches the more widespread sense of 'localness' noted in many Lancashire mill towns by Glucksmann (2000) as discussed in Section 3.2.2.

6.1.2 2001 Census data on commuting patterns

Conclusions based on these extracts of conversation are clearly impressionistic rather than being based on a controlled large-scale survey of social practices and attitudes. Other sources of data provide further means of assessing the amount of potential contact between speakers from these different places in East Lancashire. The British census provides information on commuting patterns, and the use of 'Travel to Work Areas' as a socially meaningful method of organising dialectal research has been proposed as a means of linking dialectal research in the British dialectological research community to other geographically-structured research (see Alvanides & Buchstaller 2010). The 2001 census provides a huge amount of tabular data on population movement, but one particularly helpful resource is the CommuterView CD-ROM (ONS 2008). This generates visual representations of the travel-to-work data from the 2001 census at various levels of geographical scale.

For any given 'Lower Super Output Area' (LSOA), the software generates arrows showing the commuting patterns of residents of that area. The width of the each arrow indicates the number of commuter journeys it represents. Using the postcodes of my participants, I generated CommuterView maps of the 2001 census data. Where the postcodes of my participants were spread over several LSOAs, I included a map for each LSOA; in Accrington and Ramsbottom my participants' postcodes all fell into two LSOAs, so I included neighbouring LSOAs in order to obtain four maps for each location. Figure 6.1 shows the maps for Accrington.

Here there is evidence of some mobility: small numbers of people (thin arrows) travel east to Burnley or west to Blackburn. A few people travel south in the direction of the Rossendale towns. Most people (thickest arrows) have short journeys to work within the Accrington area. This relative lack of day-to-day work-related travel lends some weight to the idea that Accrington residents are unlikely to come into regular contact with speakers in the surrounding 'non-rhotic majority' (Wells 1982: 368).

The equivalent commuting pattern data for the areas in which my Rossendale speakers live are given in Figure 6.2. Here there is a subtly different pattern. While most journeys are still short and very local (the thickest arrows), some longer commuting journeys are made. There is evidence of several journeys being made north towards Accrington or Burnley (medium weight lines). One of the maps shows a medium weight line leading directly to central Manchester: some residents of Rawtenstall clearly commute to central Manchester. Other journeys south lead

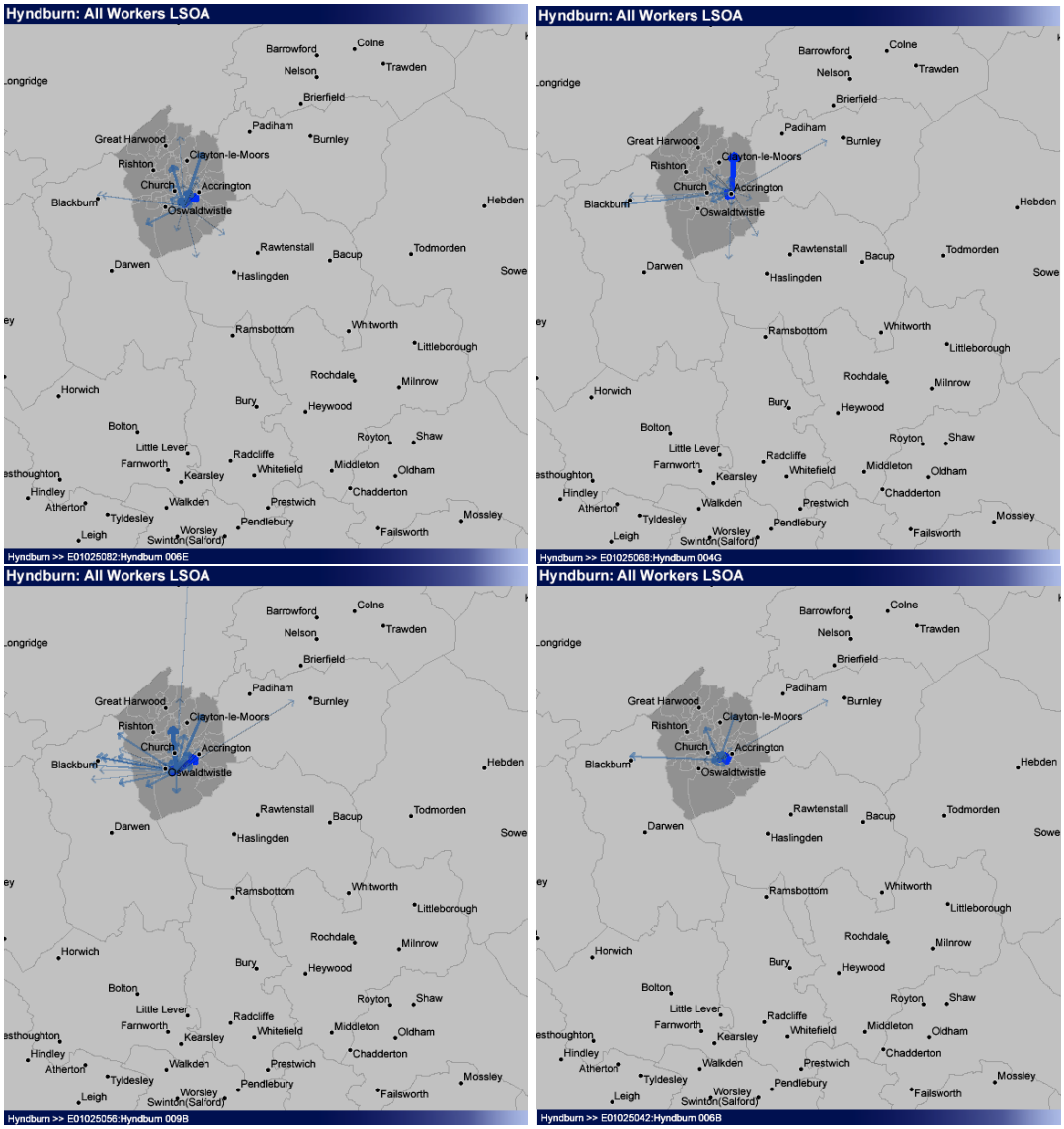


Figure 6.1
CommuterView Data: Accrington.

to Bury, but these are undertaken by very few commuters (thin lines). This suggests that there is a generally local focus in the Rossendale area, with most of the commuting that does happen taking place northwards towards Burnley or Accrington, i.e. within the traditionally rhotic area rather than outside it. Smaller numbers of commuting journeys point south, and these tend to be towards central Manchester itself rather than intermediate places.

The equivalent commuting pattern data for the areas in which my Ramsbottom speakers live are given in Figure 6.3, and these maps show a very different picture. Here, there is a lot of evidence of commuting (thick lines extending over some distance). A great deal of the journeys are to central Bury, a distance of 4 to 5 miles. Most of the remaining longer journeys

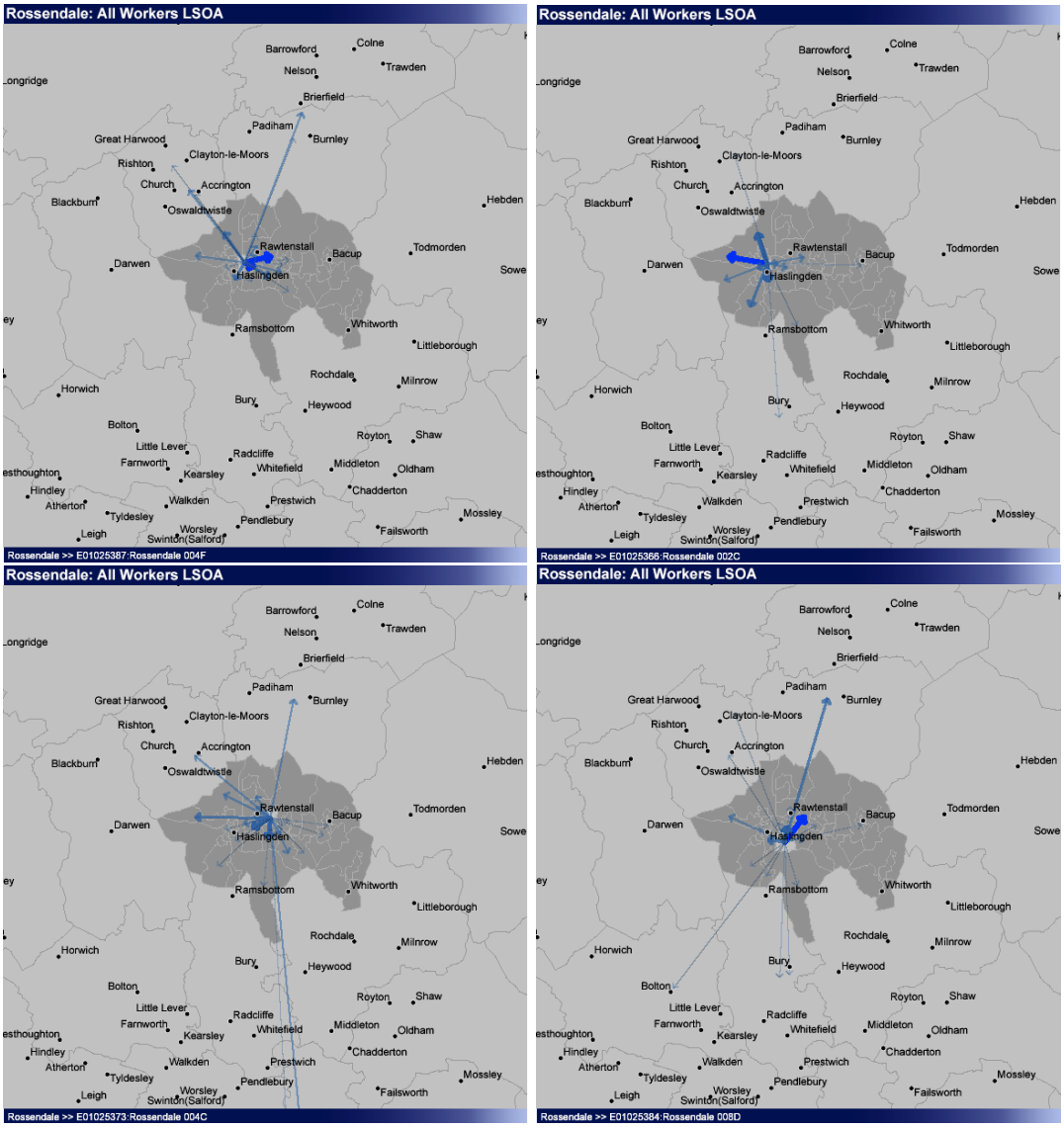


Figure 6.2
CommuterView Data: Rossendale.

are towards central Manchester, and there are more of these journeys than is the case in the Rossendale maps. There is much less evidence of commuting north towards Rossendale: any northwards arrows are very thin, indicating small numbers of commuter journeys.

The commuting pattern data for the areas in which my Bury speakers live are shown in Figure 6.4. Here again, there is strong evidence of commuter journeys south towards Manchester city centre. There is also evidence that quite large numbers of people in Bury have short journeys to work in Bury itself (thick, short arrows). There is only limited evidence of commuter journeys north to Ramsbottom. Any journeys further north towards Rossendale or Accrington are too few to be represented on the CommuterView maps.

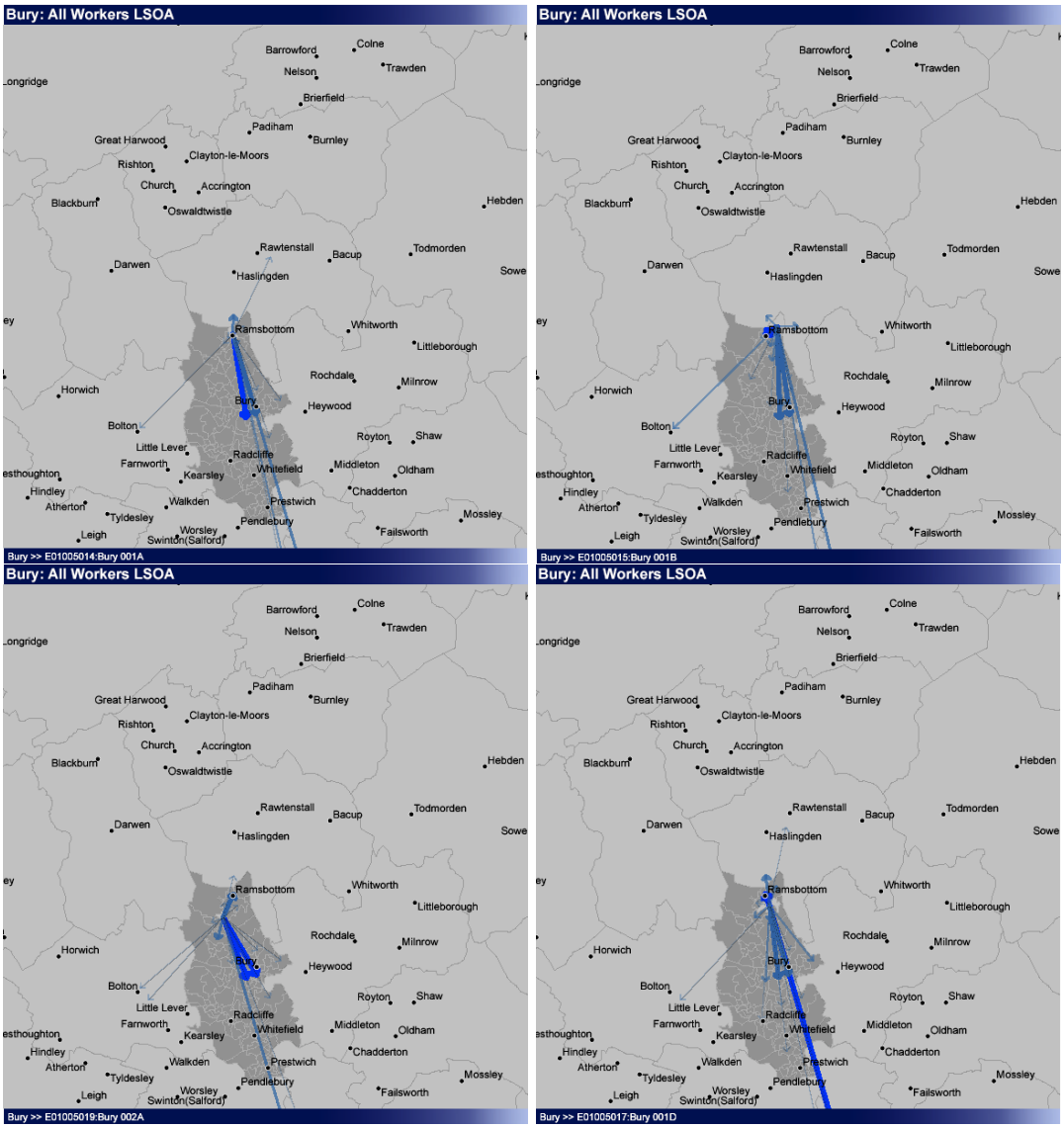


Figure 6.3
CommuterView Data: Ramsbottom.

Finally, the commuter journeys for the areas in which my Prestwich speakers live are shown in Figure 6.5. Here again, there is evidence of widespread commuting into central Manchester. There is less evidence of local journeys than there is in the Bury data: despite now being part of the continuous urban sprawl, Prestwich is itself a small centre (it is still called Prestwich village), so it is quite expected that many people will commute into the city centre for work. The fact that Bury is in some ways a more autonomous centre in its own right is shown by the presence of some commuting journeys north from Prestwich to Bury, although the thin arrows here show that there are far fewer commuter journeys north to Bury than south to central Manchester.

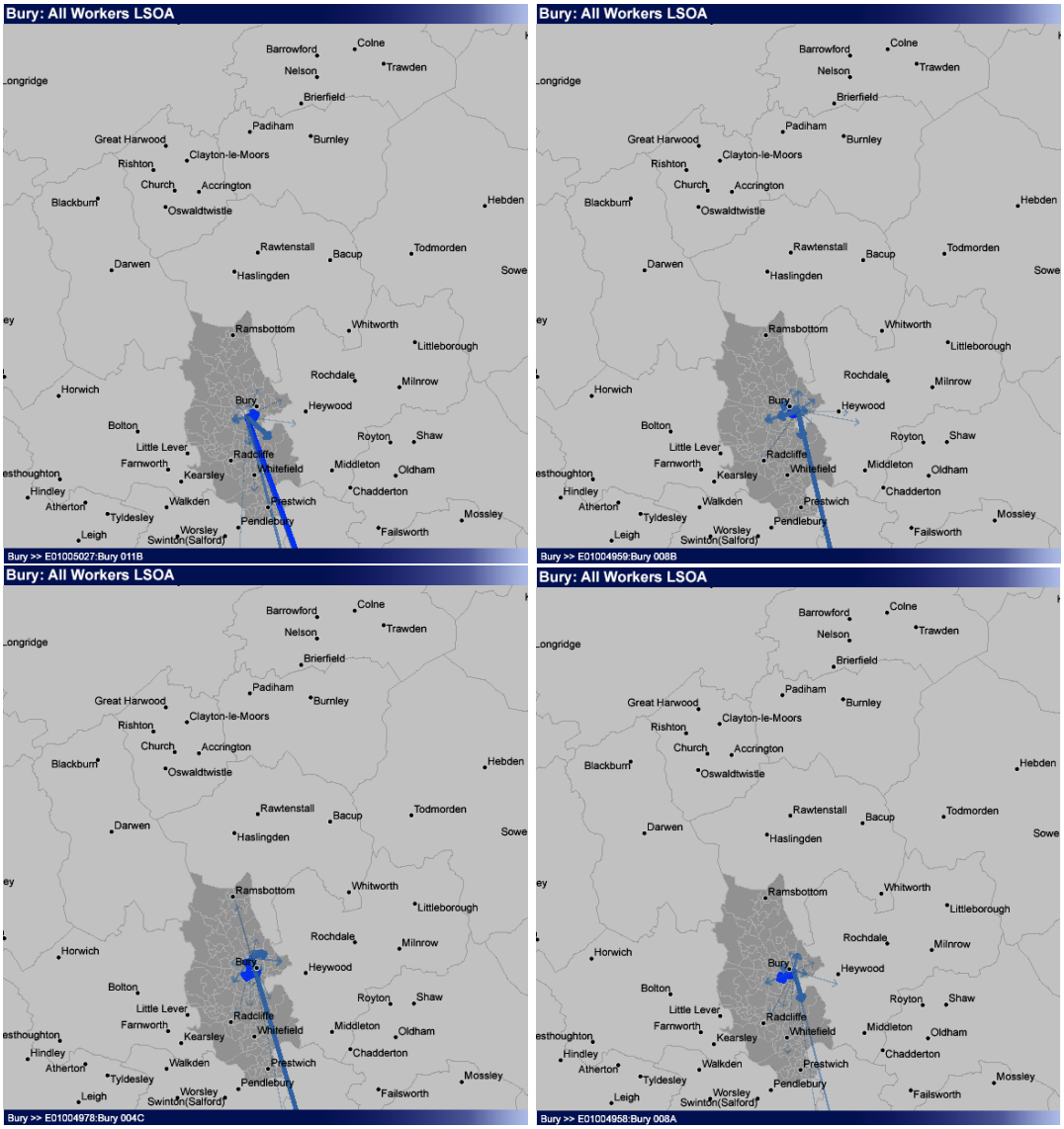


Figure 6.4
CommuterView Data: Bury.

These CommuterView maps support the idea that there is a sharp dividing line between Ramsbottom and Rossendale, which seems to be reflected in social practices (where young people socialise, journeys people make to work). However, it is also true that the distances involved are very small, and that there are bus links and other evidence of contact between people from these different towns. The overall situation is likely to involve tendencies towards contact or lack of contact rather than absolute claims about dividing lines.

The two linguistic variables in my survey, rhoticity and *r*-sandhi (and particularly intrusive-*r* as an observable feature), vary across two generalised populations. The local, minority, population are traditionally rhotic and would be predicted not to have *r*-sandhi; the supra-local, majority,

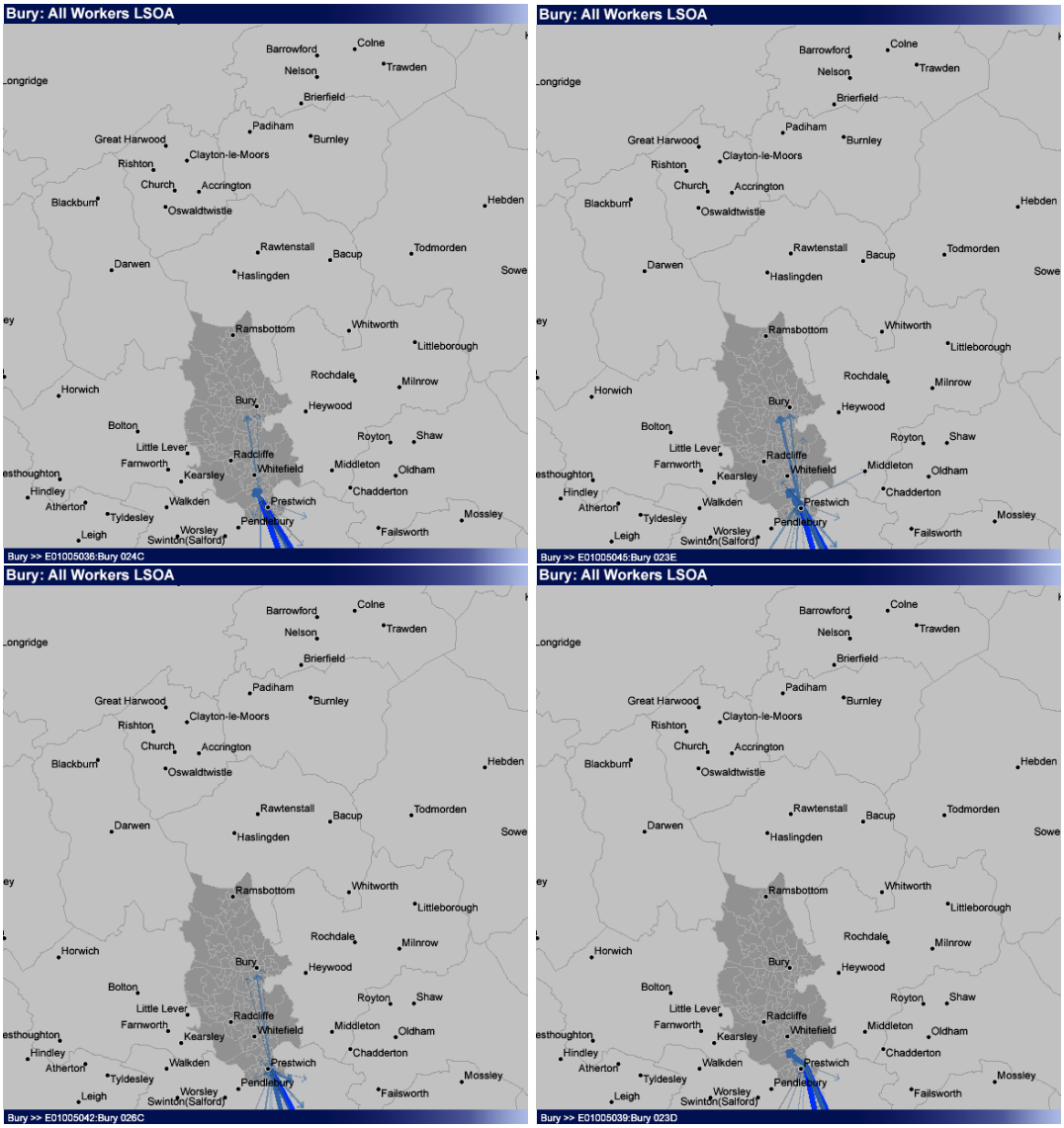


Figure 6.5
CommuterView Data: Prestwich.

population are non-rhotic and would be predicted to have *r*-sandhi. In an area where there is contact between speakers of different varieties, the hypothesis is that contact between the minority-group of speakers and the majority group of speakers may lead to gradual loss of the local minority dialect form, rhoticity in this case. The fact that the non-local non-rhotic variety is spoken in a very large and nearby conurbation also suggests that there may be influence on the local dialect form: people will come into contact with non-rhotic speakers in the course of their work or leisure activities, and there may be some prestige associated with metropolitan city speech as opposed to small-town local speech (although as Britain points out the reverse may also be true, and features associated with the city 'may be castigated as the language of

unwelcome "townies"' (2009: 139)). Although prior research points to a causal link between the loss of rhoticity and the development of intrusive-*r*, it would be possible through dialect contact for these two changes (loss of rhoticity, development of intrusive-*r*) to move differently across time and space, so that, for instance, intrusive-*r* could be adopted by some speakers who have not yet undergone a loss of rhoticity.

As I show in the next two sections, the distributions of rhoticity and intrusive-*r* seem to suggest that different processes of spatial diffusion apply to these two features, and that attrition of a traditional feature follows a slightly different trajectory from development of an innovative feature.

6.2 The attrition of a traditional dialect feature, rhoticity

6.2.1 Extent of rhoticity along the route between Manchester and Accrington

The structure of my survey with older and younger speakers allows for an apparent time analysis of rhoticity across the five locations. For the older group of speakers the mean percentage levels of rhoticity across the five locations show a strikingly linear pattern: the further from Manchester you go, the higher the level of rhoticity. This pattern is particularly clear in the left panel of Figure 5.7 (p. 123) for the elicitation task, although the left panel of Figure 5.6 (p. 121) shows a very similar pattern in the sentences task data. The conversation task data represented by the left panel of Figure 5.5 (p. 120) is very slightly different, in that the level of rhoticity in Accrington is slightly lower than in Rossendale. However, overall the data supports the hypothesis that the further from Manchester you go (and, therefore, the nearer you get to the reported 'island of rhoticity' in Accrington) the higher the level of speakers' rhoticity.

This approach provides an indication of the distribution of rhoticity across the five locations, and as such is a useful first step. However, this use of mean percentage values of rhoticity does not tell the whole story of how speakers differ from each other across locations or within the sample for an individual location: the influence of *space* and *place* (Horvarth & Horvarth 2001: 53) respectively on the variation of rhoticity. The bar charts for mean percentage values imply that there is a continuum from less rhotic to more rhotic speech; if the data are presented in a different manner it becomes apparent that there are discrete groups of speakers. The left panels of Figures 5.8, 5.10 and 5.11 represent the same raw data as Figures 5.6, 5.7 and 5.5, but this time give an indication of the range of variation within the sample for each place. The sentences task data represented in Figure 5.8 (p. 125) suggest that there are two sets of speakers. First

there are speakers who are essentially non-rhotic, and these are found in Prestwich and Bury. Second, there is a group of speakers who are much more consistently rhotic: although their rhoticity varies between 28% and 74%, it does not drop lower than 28% (and four of these six speakers are over 50% rhotic). These speakers are found in Accrington and Rossendale. The remaining speakers, who form the Ramsbottom sample, cover a huge range from 1% realised tokens of coda-*r* to 51%. While reducing these speakers' data to a mean value suggests that they form an intermediate population with respect to rhoticity, in fact it seems that Ramsbottom speakers are in effect a mixed sample, with some belonging to the non-rhotic group, and one in particular belonging to the rhotic group (this speaker, Ram14 is the oldest in the sample at 92 years old, which suggests that there could be an apparent time effect even within my Ramsbottom older sample). This discrepancy is a reminder of the importance of considering data from individual speakers as well as communities of speakers.

Pairwise comparisons of the data for older speakers from each place support the idea of two groups, a rhotic group and a non-rhotic group. As shown in Figure 5.9 (p. 127) and Table 5.6 (p. 127), the only significant differences between pairs of groups are between Bury and Accrington, Prestwich and Accrington, Bury and Rossendale, Prestwich and Rossendale. The samples from Accrington and Rossendale do not significantly differ from each other; neither do the samples from Bury and Prestwich. The Ramsbottom sample does not differ from any of the other locations, and this suggests that it is a mixed sample which could be split so that speakers are allocated to either the Prestwich/Bury group or the Accrington/Rossendale group. So, the data for older speakers indicate that there *is* a tendency for rhoticity to increase with distance from Manchester (the left panel of Figure 5.8 shows that Bury speakers are more rhotic than Prestwich speakers, and that Accrington speakers are more rhotic than Rossendale speakers). However, underlying this tendency is a two-way split between speakers with low or no rhoticity and speakers with quite high rhoticity. The geographical mid-point (Ramsbottom) also marks the divide between the two sets of speakers; the Ramsbottom sample can be split so that older Ramsbottom speakers become part of either the non-rhotic population or the rhotic population.

To summarise the older speakers' data, there is a tendency for the percentage of realised coda-*r* tokens to increase evenly with increasing distance from Manchester. In addition, underlying this surface tendency, the speakers across the five locations fall into two broad categories corresponding to non-rhotic and rhotic speech. So, the surface token-counts suggest that there is

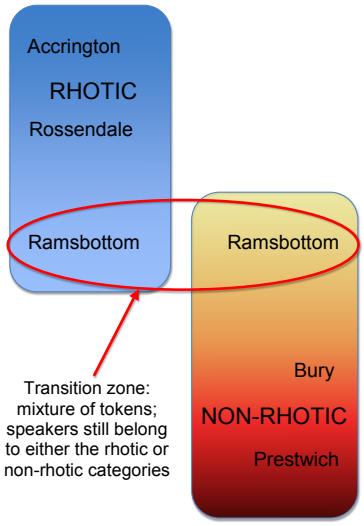


Figure 6.6
Older speakers: a transition zone between non-rhotic and rhotic varieties.

evidence for a transition zone (Chambers & Trudgill 1998: 106) in which speakers are variable in their production of coda-*r*, but despite this variation there is evidence of a division between two broad groups of speakers. This conclusion is represented in a stylised diagram in Figure 6.6.

One potential issue is the nature of the variation in the transition zone: we might expect an increase in the proportion of + tokens of coda-*r* towards the middle of the transition zone, if + (*r*-colouring or auditorially 'less consonantal' realisations of *r*) represents some sort of 'fudged' variant (Chambers & Trudgill 1998: 109) which is intermediate between clearly rhotic realisations and clearly non-rhotic realisations. However, this is not what we find: instead, the proportion of + tokens increases in line with the overall proportion of rhoticity (combined + and ++ tokens) as can be seen in Figures 5.7 (p. 123), 5.6 (p. 121) and 5.5 (p. 120). This result supports the approach of counting + and ++ tokens together as evidence of rhoticity, and using the combined total of these tokens to assess the level of rhoticity in each place.

The distribution of rhoticity for younger speakers is different. The right panels of Figures 5.7, 5.6 and 5.5 do not show any sort of continuum of increasing levels of rhoticity with increasing distance from Manchester. Instead, younger speakers in Prestwich, Bury and Ramsbottom are all essentially non-rhotic, with scores of between 0% rhoticity and 3% rhoticity (and this higher end is limited to very few speakers in particular tasks: speaker 28Pre for instance scores 0% rhoticity in the sentences task and 3.4% rhoticity in the elicitation task). However, the next furthest place from Manchester, Rossendale, shows a huge jump in levels of rhoticity to around

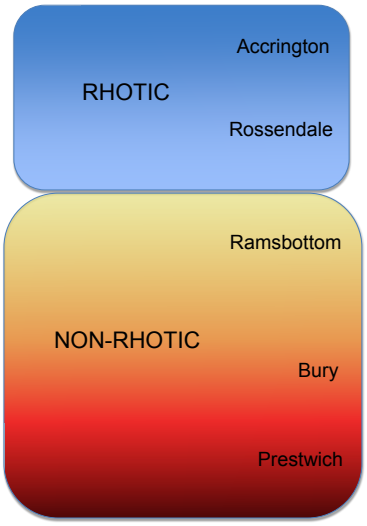


Figure 6.7
Younger speakers: a sharp isogloss between non-rhotic and rhotic varieties.

60%, and even higher rhoticity in the elicitation task data. This suggests that there has been a change: whereas the older Ramsbottom speakers were a mixed group with some quite high levels of rhoticity, the younger Ramsbottom speakers are all basically non-rhotic.

It appears, then, that there has been a reanalysis across the generations here. The older speakers are rhotic, which means they have *r*-ful underlying representations and variable deletion of coda-/r/. However, given their almost consistently *r*-less surface production, the younger speakers have presumably not acquired *r*-ful underlying representations. In contrast to the Ramsbottom speakers, the younger Rossendale speakers actually have higher levels of rhoticity than their older equivalents, and these two changes mean that there is a clear and sharply defined boundary for younger speakers, rather than a wide transition zone. While there are still two groups of speakers, non-rhotic and rhotic, the surface manifestation of this underlying categorisation leads to a sharp division between the groups, rather than the more gradual transition in the data for older speakers. The distribution of younger speakers' surface tokens of coda-*r* suggests a sharp isogloss on a dialect map. This is represented in a stylised diagram in Figure 6.7.

Interestingly, the data for Accrington speakers shows a decline in rhoticity in the younger speakers compared to the older speakers. There are two possibilities given the data: either the young Accrington speakers now belong in the same non-rhotic category as the young Prestwich/Bury/Ramsbottom speakers, or there is a third intermediate category. The non-spontaneous speech data could support the first hypothesis. As shown in the right panels of Figure 5.9 (sentences task, p. 127) and Figure 5.10 (elicitation task p. 129), the only

significant differences in young speakers' levels of rhoticity are between younger Rossendale speakers and all other groups: unlike the older speakers, younger Accrington speakers are not significantly different from Prestwich/Bury/Ramsbottom speakers. However, the lack of statistically significant difference does not mean that the Accrington speakers are necessarily targeting Manchester-focused non-rhotic speech. Their decline in rhoticity could be similar to the decline in Ramsbottom speakers' rhoticity but motivated by different causes, so that Accrington speakers are separate from Prestwich/Bury/Ramsbottom speakers, even though both are heading towards non-rhoticity. This idea of a separate Accrington grouping is supported by the data for spontaneous conversational speech, which support the second hypothesis: the right panel of Figure 5.11 (p. 130) shows that young Accrington speakers are significantly different from both the non-rhotic group (Prestwich/Bury/Ramsbottom) and the strongly rhotic group (Rossendale). This pattern could be an artefact of the 'snapshot' in apparent time represented by my younger speakers: the younger Accrington speakers could be in the middle of a change in progress (the loss of rhoticity), which has not advanced as far as it has for younger Ramsbottom/Bury/Prestwich speakers. As a result, at the time of my survey, there are three groups of younger speakers: consistently non-rhotic (Prestwich/Bury/Ramsbottom), variably weakly rhotic (Accrington); variably strongly rhotic (Rossendale).

The more gradient pattern in the old speakers' levels of rhoticity requires different (speculative) explanations. My older informants fall into two categories in terms of their education and subsequent employment. Many of them left school at the end of compulsory schooling (age 14 in the case of my oldest informants, age 15 or 16 for the rest), and worked in various local industries (cotton mills and slipper factories), before getting married and having children. Some of my older informants passed the eleven-plus examination and went to their local grammar school: these participants worked in office jobs (doing administration work for the mill companies, or working in local government administration). Both of these sets of speakers (who in the case of my sample are frequently friends or neighbours) still had a local focus: when they were young there was plentiful local employment in either manual or administrative jobs.

However, while there may have been quite a local focus for most of my older participants, they do mention travelling for shopping for clothes or for going to dances and other social events. They would certainly have come into contact with non-rhotic speakers, but it may just be that the population as a whole was less mobile than is the case now, and had a more local focus

based on where they worked and on the presence of immediate family living nearby. In other words, the local 'place' factors were a greater influence on speakers' linguistic systems than the cross-locality 'space' factors were.

The CommuterView maps suggest that, in terms of commuting to Manchester (and coming into contact with urban Manchester speakers), Ramsbottom, Bury and Prestwich are all now very similar. This would mark a change from the space factors at play when my older participants were growing up, and supports the idea that for the younger speakers there is a link between space factors and the distribution of linguistic features. Although I cannot claim a direct causal link, at the least, a change in space factor (commuting patterns) and a change in a linguistic feature (level of rhoticity) seem to be pointing in the same direction.

The fact that younger Rossendale speakers are increasing their level of rhoticity compared to their older counterparts (as shown in Figures 5.5 (p. 120), 5.6 (p. 121) and 5.7 (p. 123)) is surprising in the light of the idea of the emergence of supra-local regiolects (see for example Britain (2009: 142) and Trudgill's proposed map of future dialect areas (Trudgill 2000: 83) printed here as Figure 3.3 on page 61). However, it does match analysis of key features of Liverpool English. Watson (2006) shows that lenition of /t/ ('t→h') is being maintained in the speech of young Liverpool speakers, and now occurs in a wider range of contexts than it did traditionally. In addition, the supralocal tendency towards glottaling of /t/ is not evident in word-final contexts for young Liverpool speakers. This combination of a resistance to an incoming supralocal form and a reinforcement and widening of occurrence of a traditional feature leads Watson to conclude that Liverpool English is not 'losing its regionality but is instead moving in the opposite direction and *diverging* from supra-local norms' (Watson 2006: 61). The young Rossendale speakers could also, in their increase in levels of rhoticity, be diverging from a process of supralocalisation. However, the social circumstances are very different. While Liverpool is a city and is itself the centre of the same kind of socio-cultural focus I am investigating for Manchester, Rossendale is a much more isolated and semi-rural community. While there might currently be evidence of a fight-back against a process of supralocalisation, in the longer term there may well be increasing pressures that lead towards supralocalisation.

However, as will be discussed in Section 6.3, the young Rossendale speakers' use of intrusive-*r* complicates the matter: they are not merely maintaining a traditional variety, but seem to be moving towards a hybrid form in which currently one particular traditional feature (rhoticity)

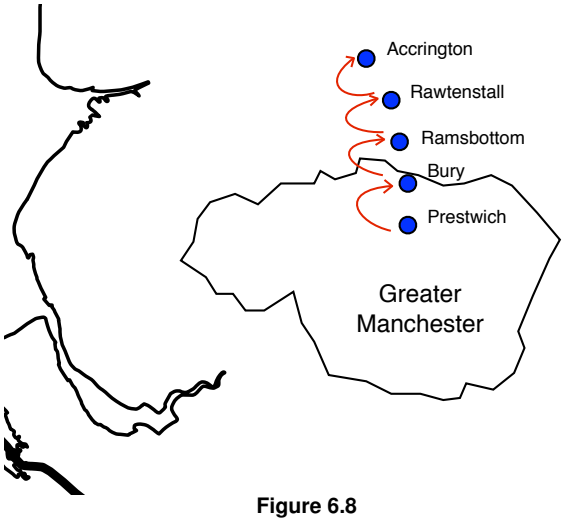


Figure 6.8
Hypothetical linear 'wave' pattern of diffusion of non-rhoticity.

is maintained and an innovative feature (intrusive-*r*) is adopted. This hybrid variety may only be a temporary step along a road that eventually leads to convergence with a more widespread supra-local variety, but it is possible that it will gain a more permanent foothold, not as a relic of a traditional system, but as a new, locally significant variety.

6.2.2 Gravity-model wave diffusion of non-rhoticity

Based on the data for older speakers from the five locations in my survey, it is tempting to propose a straightforward pattern of diffusion of non-rhoticity outwards from urban Manchester to its suburbs and on to Bury, then to Ramsbottom, then to Rossendale and Accrington. This is shown in Figure 6.8. This pattern of diffusion would match the distribution of non-rhoticity in some of my data, particularly examples such as the left panels of Figures 5.5 (p. 120), 5.6 (p. 121) and 5.7 (p. 123), which show the distribution of rhoticity for my older speakers.

This model suggests that distance from Manchester is the key factor affecting the spread of non-rhoticity. The 'spread of non-rhoticity' could be labelled in a different way as the 'attrition of rhoticity'. My data therefore provide some evidence for a pattern of how a traditional feature undergoes attrition. In the case of the older speakers' data, rhoticity holds out the longest in places furthest from the urban non-rhotic population of Manchester. This model works for the older speakers: according to the apparent time principle this represents the process of attrition of rhoticity 50 years ago. However, the data for younger speakers show a different pattern which is perhaps indicative of an urban-hierarchical pattern of diffusion rather than the wave pattern

shown in Figure 6.8. This type of diffusion is discussed in relation to intrusive-*r* in the next section, and is represented visually in Figure 6.9 on page 221.

6.3 The spread of an innovative dialect feature, *r*-sandhi

The loss of rhoticity over time can be argued to be phonologically 'a highly natural change' (Giegerich 1999: 169) that might be likely to occur in any variety of English. It could also be helped to spread by dialect contact. The development of *r*-sandhi might be expected to match this process. However, my data for rhoticity and *r*-sandhi, in particular the tabulated results for individual speakers given in Table 5.16 (p. 151), suggest that rhoticity and *r*-sandhi can diffuse differently across a population of speakers. If *r*-sandhi is a natural development once rhoticity has been lost, then one would expect *r*-sandhi to develop in a delayed action wave across my locations: once rhoticity has been lost in each location, *r*-sandhi is free to develop there. However, if *r*-sandhi (specifically intrusive-*r*) can spread through dialect contact even if some speakers adopting it have not yet lost rhoticity, then the spread of intrusive-*r* should correspond more directly to the amount of contact between speakers from different places, and may move across the places in my survey in step with other manifestations of dialect contact, rather than being a delayed-action reflex of the loss of rhoticity.

Linking-*r* has proven to be difficult to analyse in the East Lancashire data because of the problem of potentially different motivations for the same observed surface data. Therefore, the distribution of intrusive-*r* is discussed below.

*6.3.1 Extent of intrusive-*r *along the route between Manchester and Accrington*

For the older speakers, intrusive-*r* is quite frequent in Prestwich and Bury, and much less frequent in Ramsbottom, Rossendale and Accrington, as shown in the left panels of Figures 5.19 (p. 141), 5.20 (p. 143) and 5.21 (p. 143). Testing for the significance of this distribution of intrusive-*r* across different places identifies only one statistically significant set of differences across places: those for word-internal intrusive-*r* in the sentences task data (Figure 5.24, p. 148). For this set of data the localities fall into two groups: Prestwich/Bury and Ramsbottom/Rossendale/Accrington. This division approximately matches the spread of rhoticity across the five locations: at the point in apparent time represented by my older speakers, word-final intrusive-*r* was quite securely present in Prestwich and Bury, but occurred at lower levels in Ramsbottom, Rossendale and Accrington. The data for older Ramsbottom speakers have

implications for the relationship between loss of rhoticity and development of intrusive-*r*. For rhoticity the Ramsbottom sample was not significantly different from either the non-rhotic Prestwich/Bury group of the rhotic Rossendale/Accrington group, and could potentially be split, with speakers being allocated to one or other of these groups. In contrast, for intrusive-*r* the older Ramsbottom sample is significantly different from the Prestwich/Bury group, and is clearly part of a Ramsbottom/Rossendale/Accrington group. This finding suggests that, in line with the canonical view, the development of intrusive-*r* does follow chronologically from the loss of rhoticity. In Ramsbottom, where rhoticity has not been lost for all the older speakers, there is little evidence of intrusive-*r* having developed. Table 5.16 (p. 151) shows that two of the older Ramsbottom speakers, 13Ram and 14Ram, produced no tokens of intrusive-*r* in the sentences task; both of these speakers produce variable amounts of coda-*r* with 14Ram producing over 50% surface coda-*r* in the sentences task.

However, the amount of variation in levels of intrusive-*r* across different tasks and at different morphological boundaries means that there is not a consistent pattern as there is for levels of rhoticity. The left panels of Figures 5.19 (p. 141) and 5.20 (p. 143) show that for the older speakers the lowest level of intrusive-*r* is found in Rossendale. If levels of intrusive-*r* depend on amount of dialect contact, then these results fit the account given in Section 6.1 that Rossendale is the most rural and isolated of the five locations, and therefore could be expected to be the last place for innovative features to spread to, as well as being the last place that recessive traditional features would remain.

In contrast, the left panel of Figure 5.21 (p. 143) shows that Rossendale speakers do not have the lowest levels of intrusive-*r* in the data for the elicitation task, so any proposed correlation between the amount of dialect contact expected for speakers from a given place and their levels of intrusive-*r* is dependent on selecting particular data: other intrusive-*r* data do not support such a correlation.

*6.3.2 How does dialect contact affect the development of intrusive-*r*?*

The fact that there are different patterns in the intrusive-*r* data for different tasks and for different phonological contexts (word-internal and word-final) indicates that claims about the relationship between a generalised phenomenon of 'intrusive-*r*' and the amount of dialect contact between groups of speakers need to be carefully qualified. Social factors, including amount of dialect contact between groups of speakers, are not the only factors influencing the production of

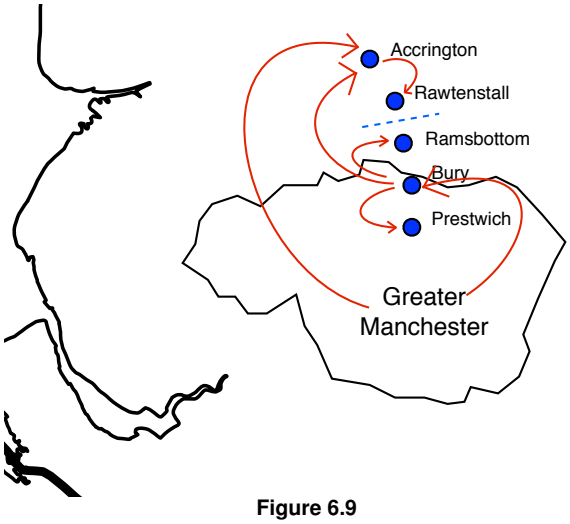


Figure 6.9
Hypothetical urban-hierarchical pattern of diffusion of intrusive-*r*.

intrusive-*r*: internal linguistic factors, such as the nature of the morphological boundary, strongly affect the production of intrusive-*r*. However, Figure 5.56 (p. 188) shows that in a global multivariate analysis of intrusive-*r* location is retained as a significant factor in the model, and that Prestwich and Bury favour the production of intrusive-*r*, while Ramsbottom, Rossendale and Accrington all disfavour its production.

Figure 6.8 showed a representation of how a 'wave' model of diffusion might explain the pattern of attrition of rhoticity in my East Lancashire locations for my older speakers. An alternative version of the gravity model of diffusion of linguistic features could be one in which there is an urban-hierarchical pattern (Horvarth & Horvarth 2001: 52), so that, while the spread of the linguistic feature is still associated with diffusion outwards from the large urban non-rhotic population (Manchester), it spreads down through a hierarchy of places, potentially leapfrogging smaller intermediate places. The new feature would reach these places later, perhaps through a secondary pattern of diffusion from the medium sized towns. This idea is represented in Figure 6.9.

This model of diffusion matches the distribution of intrusive-*r* in my older participants, as represented in the left panels of Figures 5.19 (p. 141), 5.20 (p. 143) and 5.21 (p. 143). These bar charts show older Bury speakers with the highest levels of the new innovative intrusive-*r*, with Prestwich speakers having slightly lower levels. Ramsbottom has lower still levels of intrusive-*r*. In what could be a separate development, Accrington speakers have started to produce intrusive-*r* (and the elicitation task data in Figure 5.21 shows older Accrington speakers

producing intrusive-*r* in the region of 40% of the possible intrusive contexts); this innovation could be motivated by the influence of Bury or, perhaps more likely, influence directly from Manchester. Rossendale speakers seem to be lagging behind Accrington in their production of intrusive-*r*, but as they sometimes have higher levels of intrusive-*r* than the older Ramsbottom speakers, it could be that they are influenced by what Accrington speakers are doing, rather than by what Ramsbottom speakers are doing.

It thus appears that there could be different patterns of spatial diffusion depending on whether the change involves attrition of a traditional feature or development of an innovative feature. However, there are correlations between this particular traditional feature and innovative feature. For individual speakers, level of rhoticity correlates strongly with level of intrusive-*r*, as shown in Figure 5.31 (p. 158). The complete account therefore necessarily involves a combination of the spatial diffusion effects represented in Figures 6.8 and 6.9, and the correlation of linguistic features that shows that speakers have higher levels of intrusive-*r* if they have lower levels of rhoticity.

6.4 Does there have to be a causal link between decline of rhoticity and development of intrusive-*r*?

In global terms across all the speakers in my survey there is evidence for a link between decline in rhoticity and development of intrusive-*r*. The correlation between individual speaker levels of rhoticity and intrusive-*r* is strong (Figure 5.31, p. 158), and there is evidence of a general loss of rhoticity over apparent time. However, the pattern of increase in levels of intrusive-*r* over apparent time is not so clear cut, and there is variation, particularly for Rossendale speakers. These speakers seem to be maintaining or increasing their level of rhoticity, and at the same time increasing their level of *r*-intrusion. Now this pattern could suggest that for some speakers, *r* in all its contexts is becoming some sort of symbolic feature of local East Lancashire speech. Trudgill claims there is evidence for this sort of association in South Western varieties, where hyperdialectal *r* 'becomes a local dialect symbol, and the use of that pronunciation a way of indicating dialect and local loyalty' (1986: 75). As Britain explains, this hyperdialectal *r* could be a reflection of the insecure state of rhoticity in those particular places: the area with the highest levels of hyperdialectal *r* 'could have been the site of the most intensive struggle at the time for the survival of postvocalic *etymological* /r/, since the nonetymological reaction is at its greatest there' (2009: 135). However, the situation in Rossendale with regard to intrusive-*r*

is not the same as South Western varieties with hyperdialectal *r*. In my data there is only very limited evidence of hyperdialectal *r* in words like *lager* [lɑːˈgɚ˞]: 12 tokens in the entire corpus, compared to 3229 sites of intrusive-*r* sandhi, of which 1468 were realised with a surface rhotic. Therefore, if *r* does have significance as a local identity marker, this has resulted neither in *r*-colouring being added to suitable vowels, nor to non-etymological *r* occurring in non-sandhi contexts. Instead, the Rossendale speakers seem to have developed non-etymological *r* specifically as a hiatus-filler.

Phonological accounts of *r*-sandhi often address the 'why *r*?' question. Answers have included proposals for *r* to be the default consonant which is inserted when no other consonant is specified; spreading accounts in which properties of the preceding vowel spread to a syllable onset position; the idea that *r* is the least marked option available for filling a hiatus; or the idea that an underlying /ɹ/ is present even in words where historically there was no coda /ɹ/. In the case of my East Lancashire speakers, a sociophonological explanation may be that *r* is a default hiatus filler because it has a dual socio-and-phonological function: it meets the need to fill the hiatus and simultaneously is a means of conveying local identity. This argument is somewhat complex: these speakers have apparently taken intrusive-*r* as a hiatus filler 'off the shelf' from what happens elsewhere, but have adapted it to have a local significance in terms of 'being Rossendale'. Furthermore, in doing this, the Rossendale speakers are diverging from the standard phonological patterns of being either *rhotic-and-non*-r-*intruding* or *non-rhotic-and*-r-*intruding*.

This phenomenon would be a very good illustration of Horvarth & Horvarth's point that 'place effects can mask the universal phonological patterns' (2001: 54). While intrusive-*r* is generally linked to loss of rhoticity, in the specific local circumstances of Rossendale both features are increasing in frequency. The idea that a particular hiatus-filling segment can be socially significant and can entail a reshaping of the phonological system also matches recent work on London English. Britain (2009: 147) reports that the use of [ʔ] as a hiatus filler, both in the specific cases of prevocalic instances of *the* and *a*, and in V#V hiatus positions more generally, and explains how this could be a marker of 'non-Anglo' status because of its use by various ethnic minority groups. Furthermore, this feature seems to have spread outside London: it is reported in the speech of young third-generation members of an Italian minority in Bedford (Britain & Fox 2009). Although more research is needed, this finding hints that a 'supralocal ethnolect' (Britain 2009: 147) may be emerging. A particular feature of the hiatus-filling strategy

noted in non-Anglo London and Bedford speech is that it involves a levelling of the phonological system: where many varieties employ a range of hiatus filling segments (typically [j] after high-front vowels, [w] after high and back vowels and [ɹ] after non-high vowels), this developing non-Anglo variety of English has [ʔ] in all contexts. So the new development is not just the adoption of a particular segment to fill a particular category of hiatus, but involves a reshaping of the phonological system. In the light of this, it is quite plausible for young Rossendale speakers to have reshaped their phonological system in terms of methods for filling hiatus, despite the fact that they have not undergone a loss of rhoticity and the resulting series of processes of loss of contrast and then reanalysis of the underlying structure of sets of words that are argued to have caused intrusive-*r* to have emerged in the first place.

Britain points out that Labov has argued that 'a failure to accurately transmit linguistic constraints operating on linguistic innovations is indeed one of the characteristics of diffusion, since it is driven by post–critical-period adults, who tend to be less successful and less precise transmitters of constraints on variation' (2009: 140). This discrepancy could explain the mixed rhotic-and-*r*-intruding phonology of my Rossendale speakers. It could be that they 'notice' that other people have intrusive-*r* but not that they *don't* have coda-*r*. Young Rossendalers end up with both.

Another consideration is that accounts of the attrition of a traditional feature tend to imply that in places where it is maintained, this is because the impetus for change has somehow run out of steam. In the case of my East Lancashire locations, the retention of rhoticity in Accrington and Rossendale (for my older speakers) or in Rossendale particularly (for my younger speakers) might be assumed to be because these are spatially the furthest from non-rhotic Manchester (assuming a spatial urban-hierarchy as in Figure 6.9), and so its influence is least relevant in these places. However, Britain points out that this assumption should not go unquestioned, and that the local significance of the features should be considered too: 'nonadoption is more likely to be explained by the local contest between adopting the innovation and retaining the traditional form than with the spatial impetus for the innovation to spread further' (2009: 140). This chimes with Horvarth & Horvarth's claim that '[p]lace effects focus analysis on the multiple pressures on language and can involve social conditions such as the positive or negative evaluation of the spreading feature' (2001: 53). If maintaining rhoticity is actually an active locally-significant choice determined by place factors, rather than a passive result of space factors, then a similar

contact-induced, active process could lead to the adoption of intrusive-*r*. In this case, the presence of both a maintenance of traditional rhoticity and an adoption of innovative intrusive-*r* is not as surprising as would at first be assumed.

Indeed, the resulting distribution of rhoticity and *r*-sandhi in Rossendale speech could be argued to be evidence of a new variety, in which both features are compatible. Examples of this type of innovation in the literature are often to do with vocalic contrasts such as the MOAN/MOWN contrast in traditional East Anglian speech, which is under pressure to merge as in neighbouring varieties (Trudgill 1983: ch. 4). Speakers there have adopted a phonetically intermediate vowel, so that effectively a new variety has emerged, rather than the incoming merged vowel just taking over from the traditional two-vowel contrast (Trudgill 1983: ch. 4). This sort of finding leads Britain to argue that '[g]eolinguistic diffusion ... is not as straightforward as the simple victory of an innovative form over a traditional one. Both forms compete and accommodate to each other in local speech communities ... The accommodation between innovation and conservative form can sometimes lead to new hybrid forms emerging, present in neither original dialect, but clearly derived from contact between them' (2009: 141). In the case of East Lancashire rhoticity and intrusive-*r* the hybrid form does not involve phonetically intermediate vowels, but rather a mixed phonological system.

6.5 Summary of findings

There is evidence for the potential influence of both 'place' and 'space' on rhoticity and *r*-sandhi. This evidence comes from comments made by my participants during their interviews, from Census data on commuting patterns, from existing sociological research, and from the physical geography of the five localities in my survey. For rhoticity, there has been a change in apparent time, such that rhoticity is now more restricted geographically. While there was some evidence of rhoticity in older Ramsbottom speakers, there is virtually none in younger Ramsbottom speakers, and rhoticity is now confined to Accrington and Rossendale. Furthermore, there is a decline in rhoticity in Accrington too (although it has not reduced to the level of Ramsbottom), which suggests that even this reported 'island of rhoticity' is shrinking and is becoming focused on Rossendale. This distribution of rhoticity is compatible with the idea of a 'wave model' of diffusion, in which the new, non-rhotic system diffuses outwards from the largest conurbation, and the traditional feature of rhoticity holds out longest in areas which are spatially furthest

from this conurbation (and this spatial distance could be socially-constructed 'distance' rather than simple Cartesian distance).

As well as rhoticity becoming focused on Rossendale, it also seems to be increasing there. This increase has the effect of sharpening the divide between non-rhotic and rhotic areas. Although the data for older speakers do support the idea of there being a divide between rhotic and non-rhotic speakers, the mean levels of rhoticity for each area suggest a degree of gradience from non-rhotic to rhotic speech. In contrast, the data for younger speakers suggest a sudden and dramatic change in levels of rhoticity between Ramsbottom and Rossendale. This finding is compatible with the idea of young Rossendale speech diverging from a supralocal variety rather than converging towards it.

The data for intrusive-*r* generally support the idea that intrusive-*r* develops once rhoticity has been lost. For example, while older Ramsbottom speakers still show a degree of rhoticity they show little evidence of intrusive-*r*. In contrast, the younger Ramsbottom speakers are more consistently non-rhotic and have much higher levels of *r*-intrusion. However, not all the data fits this pattern: the younger Accrington and Rossendale speakers, who are still rhotic (although they vary in the levels of surface coda-*r* they produce), are adopting intrusive-*r* well before rhoticity has been lost. In the case of Rossendale speakers in particular this trend goes even further: they are increasing their levels of both rhoticity and *r*-intrusion. This increase could be evidence that for these speakers *r* is becoming significant as a local symbolic marker, as has been argued for hyperdialectal-*r* in South Western varieties of English. However, there is virtually no evidence of hyperdialectal non-sandhi *r*: it appears that the young Rossendale speakers have adopted the use of *r* as a hiatus filler, even while they increase their production of coda-*r*. This change suggests that while it is generally true that there is a causal link between loss of rhoticity and development of intrusive-*r*, this link is a diachronic link, not a synchronic, structural link, and it is possible for the two processes to become delinked. While rhoticity can 'hold out' even in the face of dialect contact with a surrounding population of non-rhotic speakers, *r*-sandhi can be introduced by this same dialect contact.

6.6 Problems with my use of geographical space as a variable

There are inevitably compromises in the design of a research project, especially one that is carried out by a single researcher with constrained resources. In my case, efforts to establish a balance between being able to investigate variation across different localities and variation

within the communities of speakers in each place meant that I had a limited number of places to compare. These were chosen carefully in order to investigate a particular hypothesis: the influence of Manchester speech on speakers progressively further from the city. However, the real-world situation is clearly far more complex than this. The relationship between my more northerly locations and their nearest larger towns would clearly be worth investigating further. Although Blackburn and Burnley are included in the 'island of rhoticity' as described by Britain (2009: 133), there are locally-significant differences and influences that may be at least as important as the influence of the Greater Manchester conurbation. Vivian (2000) found that there was a trend towards loss of rhoticity in the Blackburn/Accrington/Burnley area, and Britain reports that this 'loss is more marked in Burnley' (2009: 133). Austin (2007: 42) reports that Haslingden and Crawshawbooth (both in the Rossendale area) are strongly rhotic, but Burnley has much lower levels of rhoticity. Similarly, my younger Accrington participants make several jokey references to Burnley as 'Bunley', which seems to provide anecdotal evidence of some perception of non-rhoticity in Burnley speech.

Another factor in my use of geographical space as a variable is my choice of participants. Potential participants self-selected themselves as being local and 'born and bred' in the town in question. This gave a degree of control to the nebulous factor of 'place', although the distances are so small and the degree of contact between people from different places so high that I could not argue that my sample in each place is representative of the overall population in that locality. For example, large numbers of people in towns such as Ramsbottom do commute into the city of Manchester, and many of the housing estates to accommodate such commuter populations have been there since the 1970s and 1980s. Even my 'local' participants almost certainly have relatives and friends who are not from the area, and this is true of my older speakers as well as my younger speakers. It would have been useful to be able to survey people at different degrees of 'localness' (people whose parents were also born in the same village, people whose parents were originally from elsewhere, people who moved to the area as young children and so on), although clearly this differentiation would exponentially increase the numbers of participants needed.

A further issue is the ability to disentangle related social variables. I have focused on distance from Manchester (both physical and socially contracted in terms of transport links). Other variables may also be relevant. Although there are many similarities between the types of

lives my participants have led, there are certain differences. One such might be an urban/rural continuum. Although none of my participants has led an inner city life, and none of them has lived in rural isolation, there is a continuum from small town to larger town or city suburb.

6.7 Possibilities for future research

Obviously there is always room for more data gathering, perhaps covering a wider geographical spread, or sampling other social groups. The urban/rural continuum could be investigated more. In terms of theory and analysis, more nuanced ways of assessing participants' social attitudes and practices could be used. My method of using conversational 'prompts' during the interview did produce many useful snippets of evidence, but these take the form of conversational anecdote, and as such are not directly comparable from speaker to speaker. Questionnaires about personal contacts across places and about personal attitudes to these different places could provide a more consistent set of data for each participant.

Chapter 7

Implications for models of phonology

I begin by discussing the linguistic factors that affect the production of coda-*r* and *r*-sandhi in the East Lancashire data. This is 'small picture' phonology, resulting from specific details of the East Lancashire data presented in Chapter 5. I then go on to discuss how a phonological model can be arrived at which explains the East Lancashire speakers' use of both coda-*r* and intrusive-*r*. I focus on this 'big picture' phonology as I go on to discuss the implications of the East Lancashire results for the existing debate in the literature about modelling *r*-sandhi in non-rhotic speakers.

7.1 Phonological factors affecting realisation of coda-*r*

In the previous chapter I showed that levels of coda-*r* production were affected by social factors, including speaker age and place. The apparent time approach was used to show how the distribution of rhoticity had changed through time and had become geographically more restricted in the speech of younger participants. The data also allow consideration of linguistic factors affecting the production of coda-*r*. The global multivariate Rbrul analysis of coda-*r* as presented in Figure 5.1 (p. 115) shows that although both social and linguistic factors were significant, the first three factors added to the model were linguistic: backness of the preceding segment, nature of the following segment and nature of the morphological boundary (including a 'not applicable' category for non-boundary tokens of coda-*r*). The stress of the preceding syllable was also added to the model (after the social factor of place).

I consider evidence from the data about each of these phonological factors.

*7.1.1 Influence of the preceding segment on the production of coda-*r

Figure 5.47 (p. 175) shows the percentage of surface word-final coda-*r* in the sentences task after each preceding segment. There is fairly little variation across the range of preceding segments,

apart from a preceding schwa, which leads to much lower rates of coda-*r* production (preceding [ɪə] shows the same pattern as schwa; preceding [ʊə] is based on only 5 tokens, so although it seems to greatly favour production of coda-*r* I do not count it here). Of course, there is the question of labelling a preceding centring diphthong with a coda-*r*: phonologically for a rhotic speaker we might expect /ur/. However, the phonetic realisation was [ʊəɪ] or [ʊɚ], and so I counted these tokens as having preceding [ʊə]). This pattern is also shown in Figure 5.47 (p. 175) for non-boundary position coda-*r*, in which preceding [ə, ɜ] lead to lower rates of surface coda-*r* than preceding [ɑ, ɔ]. Although there is a link between the distribution of [ə] and the stress of the syllable, in my data it is not simply a question of unstressed weak vowels favouring non-production of coda-*r*: the central vowel [ɜ] also disfavours coda-*r* production, and the other vowels [ɑ, ɔ, ɛ] could also occur in 'weak' contexts in my data. There is a wider inventory of possible vowels in weak contexts in northern varieties of English than in for example RP, as acknowledged by Wells: 'the use of /ɒ/ rather than /ə/ in unstressed *con-* as: *consider*, *condition*, *computer* (1982: 300).

In the Rbrul analysis of coda-*r* production I collapsed the categorisation of preceding segments into back versus non-back segments. This conflation followed the approach taken by Hay & Sudbury (2005). The result was that preceding back segments were shown to favour production of following coda-*r* and preceding non-back segments were shown to disfavour its production. This finding matches the simple percentage-based analysis shown in Figures 5.47 (p. 175) and 5.48 (p. 176), in that the central vowels [ə, ɜ] disfavoured coda-*r* production while the back vowels [ɑ, ɔ] favoured its production.

*7.1.2 Influence of the following segment on the production of coda-*r

In the multivariate Rbrul analysis in Figure 5.54 (p. 184) the factor for 'following segment' was retained as significant. The levels of this factor show that prepausal contexts favour the production of coda-*r* while preconsonantal contexts disfavour its production. This result is expected in terms of ease of articulation: tokens of coda-*r* in a coda consonant cluster or immediately followed by a consonant are more likely to be 'lost' due to the need to articulate the next consonant; prepausal tokens of coda-*r* may be more prominent.

7.1.3 Influence of the morphological boundary on the production of coda-r

While the factor for morphological boundary was included in the Rbrul analysis in Figure 5.54, its levels do not tell us much about the relative influence of different boundaries on the production of coda-*r*. For a start, of course, coda-*r* is not restricted to boundary position as, by definition, are linking and intrusive-*r*. This non-boundary context appears to be the most favourable to production of coda-*r*, followed by word-internal morpheme boundary position and word-final position. All of these contexts favour the production of coda-*r*. The remaining 'clitic' category contained cliticised forms such as *there's a lot* or *Shore's a nice place*. This context disfavoured production of coda-*r* in the Rbrul model.

7.1.4 Influence of the stress of the preceding syllable boundary on the production of coda-r

The initial coding of stress of the preceding syllable was reduced to a binary distinction of stressed vs. unstressed. This factor was retained as significant, with stressed preceding syllables favouring production of coda-*r* while unstressed syllables disfavour its production.

7.1.5 Conclusions about phonological factors affecting production of coda-r

It is notable that the first three factors added to the Rbrul model are phonological rather than social factors. Although location was significant (with Rossendale and Accrington favouring production of coda-*r*, and Ramsbottom/Bury/Prestwich disfavouring its production), task style was not. This lack of style-shifting suggests that for an individual speaker (who is either more rhotic or less rhotic in terms of surface appearance of coda *r*) the factors affecting production of coda-*r* are linguistic (preceding and following segment, stress, presence and properties of a boundary position) rather than social (style shifting). This lack of social conditioning is interesting given the general impression of non-standard low-prestige associated with rhoticity in England 'through a typical quirk of linguistic fate' (McMahon 2000: 263). However, it does chime with Austin's results which show a lack of correlation between rhoticity and self-perception for East Lancashire speakers, and an apparent lack of (self)conscious awareness of rhoticity by these speakers (Austin 2007: 54–55).

7.2 Phonological factors influencing realisation of linking-*r*

The observable surface feature of a realised *r* in a linking environment such as *hearing* or *hear it* can be the result of different processes for different speakers. For rhotic speakers, a surface

[ɹ] would be produced even in a non-prevocalic context; the most that needs to be explained in prevocalic contexts is the possibility of a resyllabification into onset position, if the model of phonology requires that onsets should be filled where possible. For non-rhotic speakers, a surface [ɹ] in the examples just given is clearly a different process: these speakers would not have a surface *r* in non-prevocalic position, and so its appearance must be explained as an instance of *r*-sandhi. My range of speakers includes people who are almost consistently non-rhotic, as well as speakers with varying levels of coda-*r* production. How are surface realisations of *r* for this second category of variably rhotic speakers to be analysed? This problem has no answer: it is not possible on a token-by-token basis to establish whether a variably rhotic speaker is producing linking-*r* by a fairly passive process (involving at most resyllabification) or by an active sandhi-process.

Other research has found a variable pattern of linking-*r* in variably rhotic speakers. Hay & Sudbury (2005: 809) show that '[a]s speakers become less rhotic, their use of /r/ at word-boundary linking positions also declines'. I do not find such a correlation: Figure 5.28 (p. 155) shows that despite quite a wide range of levels of production of word-final linking-*r*, there is no significant correlation between level of rhoticity and production of word-final linking-*r* in my East Lancashire data. There is far less variation in word-internal morpheme boundary linking-*r*, as shown in Figure 5.29 (p. 156), and predictably there is no significant correlation between word-internal linking-*r* and level of rhoticity. This finding does match the results for archive New Zealand data (Hay & Sudbury 2005: 816) in which word-internal linking-*r* remained 'robustly categorical' throughout the transition from rhotic to non-rhotic speech. The difference between the archive New Zealand data and my East Lancashire data may well be connected to the different diachronic approach. While I have an element of apparent time with older and younger speakers, and 'apparent space-time' with different localities being characterised by different levels of rhoticity, the pattern in my data just does not match the more continuous nature of the New Zealand apparent time data: those speakers were interviewed as part of two recording projects (one in the 1940s the other in the 1990s), but the speakers were born over a period during which there was a wholesale loss of rhoticity. Despite its reduced geographical distribution over apparent time in my data, rhoticity is still present for some of my speakers.

Nonetheless, despite the overall lack of a correlation between word-final linking-*r* and level of rhoticity, there are some patterns that can be observed. Figure 5.45 (p. 173) shows that a

preceding [ə] is less likely to lead to production of word-final linking-*r* than is preceding [ɑ, ɔ, ɛ]. Preceding [ɜ], another central vowel, is even less likely to lead to production of linking-*r*. In the multivariate analyses of linking-*r* I collapsed the categorisation of the preceding segment into back versus non-back, with the result that preceding back vowels favour the production of linking-*r* and preceding non-back vowels disfavour its production (Figures 5.55 (p. 186) and 5.57 (p. 190)). While this finding is slightly contradictory with respect to preceding [ɛ], the general picture is that linking-*r* is less likely to be produced after [ə, ɜ] than after back vowels [ɑ, ɔ]. This matches the tendency for coda-*r*, and suggests that in environments in which coda-*r* is less likely, linking-*r* is also less likely. The synchronic matching of linking-*r* and coda-*r* implies that when it comes to diachronic change (as in the case of rhoticity being lost over time in New Zealand speech) linking-*r* may well reduce in step with reductions in coda-*r*. The situation in my East Lancashire data involves synchronic variation across localities, and it is not certain that rhoticity is declining across all the localities (note the increase in levels of coda-*r* in some of the data for younger Rossendale speakers). This inclusion of different varieties of English in my data may explain the lack of an overall correlation between rates of coda-*r* and linking-*r*.

7.3 Phonological factors affecting realisation of intrusive-*r*

Like coda-*r* and linking-*r*, intrusive-*r* also varies in my East Lancashire data with respect to social factors: place, age and, unlike coda-*r*, task style. However, phonological factors influence the production of intrusive-*r*: some of these also influence rhoticity (preceding segment), but others (stratum of suffix leading to word-internal boundary hiatus) affect only intrusive-*r* (Figure 5.60 (p. 194) shows that Rbrul was unable to add any factors as significant to a model of word-internal linking-*r* when stratum of suffix was one of the factors input to the model).

*7.3.1 Influence of the preceding segment on the production of intrusive-*r

Figures 5.43 (p. 170) and 5.44 (p. 172) for word-final and word-internal intrusive-*r* show slightly different patterns with respect to the influence of the preceding segment. In word-final contexts a preceding [ɔ] led to lower levels of intrusive-*r* than did preceding [ɑ] or [ə] (the token counts for preceding [ɛ] and [ɜ] were very low and were based on items of somewhat uncertain lexical status, so I ignore them here). There was a similar pattern in the word-internal data, in that preceding [ɔ] led to lower levels of intrusive-*r* than preceding [ɑ] or [ə], but this time preceding [ə] led to the highest rate of intrusive-*r* production: 51%. This influence of the preceding context

has been commented on for RP, where *r*-sandhi is well established as part of the phonology, but is subject to social comment. Wells observes that in the case of preceding [ɔ] there is 'rather more sentiment against intrusive /r/ in this environment than in those previously mentioned, due no doubt partly to the fact that it constitues a more recent development (since *manna–manner*, *Korea–career*, *Ma–mar* became homophonous before *law–lore did*' (1982: 225). It is interesting that intrusive-*r* varies differently across preceding segments from the patterns observed for coda-*r* and linking-*r* (as discussed above in Sections 7.1.1 and 7.2). For coda-*r* and linking-*r*, *r* production was less likely after [ə] than after [ɑ, ɔ]; for intrusive-*r*, *r* production was less likely after [ɔ] than after [ə, ɑ]. This suggests that intrusive-*r* is different from linking-*r* in my East Lancashire data.

The multivariate analysis of intrusive-*r* in Figure 5.56 does not have the same ranking of preceding segments: both preceding [ɑ] and preceding [ɔ] favour the production of intrusive-*r*, while preceding [ə] disfavours its production. Unlike in the case of rhoticity, there is a significant task-style effect for intrusive-*r*, and the bar chart showing percentages of realised intrusive-*r* by preceding segment in the elicitation task (Figure 5.49, p. 178) also shows that preceding [ə] leads to a slightly lower level of intrusive-*r* than does preceding [ɔ].

This difference is unexpected in the light of Hay & Sudbury's results for archive New Zealand data (Hay & Sudbury 2005: 813) which show preceding [ɔ] as the least favourable context for production of coda-*r* and in the light of Cruttenden (2001: 288), who says that intrusive-*r* is most common after schwa. This is not a universal fact though: in contemporary New Zealand English there is evidence that preceding [ɔ] is now the *most* likely preceding vowel to lead to production of intrusive-*r* (Hay & Sudbury 2005: 815).

Given the task-style related effect for intrusive-*r*, and the fact that my elicitation task contributed a large number of tokens of word-internal intrusive-*r* to the overall dataset, there could be a task-related explanation for the modelling of preceding [ɔ] as a favourable context for production of intrusive-*r*. It may be that the intensive repetition and mixing of linking and intrusive contexts (*Shaw+ish* versus *Shore+ish* for instance) led to higher levels of intrusive-*r* than would be obtained in spontaneous speech. However, it is not clear why this would affect preceding [ɔ] more than other vowels.

*7.3.2 Influence of the stratum of the suffix on the production of word-internal intrusive-*r

The barchart in Figure 5.53 (p. 182) shows that suffixes that are clearly stratum 2 lead to a slightly lower rate of intrusive-*r* production than do suffixes that are stratum 1 or suffixes that could be either stratum 1 or 2. This finding is supported by the multivariate analysis of word-internal intrusive-*r* given in Figure 5.59 (p. 192), which shows that stratum 2 suffixes disfavour the production of intrusive-*r* compared to stratum 1 suffixes or stratum 1 or 2 suffixes. As mentioned in Section 5.11.5, this could be related to the stress-shifting properties of –IC and –IAN: these suffixes favour the production of intrusive-*r*, whereas the non-stress-shifting –ISH and –Y disfavour the production of intrusive-*r*. Alternatively, the morpho-phonological difference between stratum 1 and stratum 2 suffixes could be relevant here. Chomsky & Halle (1968: 364) distinguish 'the most elementary boundary', +, from the word boundary, #, which implies that there is a tighter link between morphemes linked at + boundaries than at # boundaries. Kiparsky (1999: 40) discusses the difference between stratum 1 affixation and stratum 2 affixation in terms of a difference in 'boundary strength'. It is evident that some processes, such as assimilation, apply only across the stronger (stratum 1) boundaries (Kiparsky 1999: 41). Although the differences in levels of intrusive-*r* across different suffix strata are small, they are significant (see Table 5.30 on p. 182), and this suggests that intrusive-*r* may be more likely to apply across stratum 1 boundaries than stratum 2 boundaries.

7.4 Fundamental issues from the East Lancashire data

There are three key questions arising from the East Lancashire data. First, there are speakers who are non-rhotic and *r*-intruding: how are they to be accounted for? Second, there are speakers who are variably rhotic and also variably *r*-intruding such that the level of *r*-intrusion negatively correlates with the level of rhoticity: how are they to be accounted for? Third, there are a few speakers in Rossendale who are variably rhotic and variably *r*-intruding, but these speakers have higher levels of both rhoticity and *r*-intrusion than surrounding speakers, and these levels are higher than older speakers in the same place, suggesting that level of rhoticity and level of *r*-intrusion are *not* negatively correlated for these speakers: how are they to be accounted for? I address each point in turn.

First, at one end of the geographical survey there are speakers who fit the standard account: they are non-rhotic and have an active *r*-sandhi system. For these speakers (mainly Prestwich; for younger speakers this group includes Bury and Ramsbottom too) all of the issues that have been

argued over with respect to RP also apply. Their use of linking and intrusive-*r* is clearly a single sandhi phenomenon, with what variation there is between linking and intrusive-*r* attributable to the usual explanations of sociolinguistic stigma for intrusion. There is the least to say about these speakers, not because they are not interesting, but because their data fits precisely into existing models, and all the same debates about intrusion or deletion rules, or other possible motivations for *r*-sandhi that have been had in relation to RP, can also be carried out with the data from these non-rhotic and *r*-intruding speakers.

Second, there is the main group of speakers in the data, for whom level of rhoticity and level of *r*-intrusion are negatively correlated. Exactly as Hay & Sudbury (2005) found for diachronic change in early New Zealand English, this set of data presents a problem for some conventional accounts of *r*-sandhi. The varying levels of rhoticity suggest that these speakers have an underlying coda /ɹ/ which is subject to deletion in non-prevocalic contexts, but that this deletion occurs variably. (This is in contrast to the consistently non-rhotic speakers mentioned in the last paragraph, who could very plausibly have reanalysed the underlying representation of historically *r*-ful words and now have an insertion rule in prevocalic contexts). The main set of speakers cannot have underlying reanalysed representations with no coda /ɹ/ and an *r*-insertion rule which leads to variably inserting a surface [ɹ], because if they were doing this they would unavoidably also be inserting [ɹ] variably in non-etymological positions to give the 'hyperdialectal' *r* of examples such as *sauce* [sɔːɹs].

This is not what we find for these speakers: only a very few such tokens are present in the data, nowhere near enough to be in any way statistically significant, and in no way comparable to the amount of variation in rhoticity where the spelling and etymology reflects a coda /ɹ/. So, these speakers who are variably rhotic in terms of their surface production must be still phonologically rhotic, i.e. they have an underlying /ɹ/ in coda position. This is clearly problematic for their production of intrusive-*r*, because the speakers must either (1) have developed an insertion rule despite still having a deletion rule for coda /ɹ/, or (2) have reanalysed *r*-less words such as *law* to be *r*-ful despite having no apparent reason for doing so. Proposal (2) is not only unlikely, but is actually ruled out, because while realisation of a citation form of *lore* varies between forms with or without surface [ɹ], a citation form of *law* is never realised with a surface [ɹ]. So, this second set of speakers seems to require both a deletion rule and an insertion rule. But the fact that the surface incidence of [ɹ] in coda position correlates negatively with

the surface incidence of [ɪ] in intrusive position still remains. Of course, correlation does not imply causation, but if we propose that the *r*-insertion rule that these speakers have in intrusive contexts is separate from the *r*-deletion rule that they have in coda contexts, then we just have to accept that the correlation of the outputs of these rules is simply a coincidence, and that there is nothing intrinsic to the rules such that their outputs should correlate. Given that the same pattern has been found in at least two datasets (archive New Zealand data and present day East Lancashire data) this solution seems to be dodging the issue.

Third, the small group of Rossendale speakers, who are variably rhotic and variably *r*-intruding, presents a different problem, because their increase in levels of coda-*r* and intrusive-*r* (compared both to geographically neighbouring speakers and to older speakers in the same locality) means that level of rhoticity and level of coda-*r* are not negatively correlated for these speakers. These speakers too must have underlying coda /ɪ/, with a deletion rule which operates sometimes (but not as often as speakers in neighbouring localities), and they must have a separate insertion rule, which again operates only sometimes (but again, more often than it does for speakers in neighbouring varieties).

The presence of intrusive-*r* in the speech of my rhotic speakers is problematic because inversion accounts of intrusive-*r* require that underlying coda /ɪ/ has been lost, but deletion accounts require a motivation for reanalysing e.g. *Leah* to include coda /ɪ/ (or coda /∅/) underlyingly. Given the observed patterns in the data, some further explanation is required, and that is the focus of the next section.

7.5 How is it possible for rhotic speakers to have *r*-sandhi?

Most empirical evidence suggests rhotic speakers do not have *r*-sandhi. Speakers of General American or Scottish Standard English do not. Why not? Giegerich (1999: 196) makes the following argument:

> Rhotic varieties have no [r]-sandhi (which would, by definition, be 'intrusive' [r]) even if they have liaison. The reason for this is that in rhotic varieties, [r] and schwa (however phonetically similar they may or may not be) are not in complementary distribution (*Leda* vs. *leader*, *piston* vs. *cistern* etc.) and hence cannot have a common underlier. In such varieties, rhyme-[r] has not historically merged with schwa and must therefore be synchronically distinct from it.

These examples show that [ə] and *r* (for the sake of argument, *r* could be approximant [ɹ], the phonetic realisation of /r/ typically argued to be phonetically close to [ə]) are not in complementary position as are, for example, clear and dark allophones of /l/. However, these pairs show parallel distribution only if we assume a syllabic *r* in *cistern* to give a minimal pair /pɪstən/∼/sɪstrn/. But, especially in unstressed final syllables, we know there can be free variation between syllabic [ɻ] and a schwa+*r* sequence [əɹ]. Indeed, in some examples proposed in the literature a [əɹ] sequence seems more plausible than a single [ɹ], especially where the *r* can be resyllabified onto a following onset position. Consider the pair *feverish*∼*diva-ish*. While Heselwood (2006) notes [fiːvɹɪʃ] as a possible realisation of *feverish*, [fiːvəɹɪʃ] is at least as likely, if not more so. For *piston*∼*cistern* to indicate truly parallel distribution we must assume that [əɹ] is an allophone of /r/ (see Heselwood 2006, who makes this assumption to avoid the 'double /r/' problem) or that the schwa does not reflect a phoneme in the lexical underlying representation ('prosodic schwa'), or that these examples do not really show parallel distribution (and therefore contrast) between /ə/ and /r/, but rather show /r/ contrasting with its absence, as in examples (7:3) and (7:4).

(7:1) [pɪstən]

(7:2) [sɪstəɹn]

These could be taken as evidence for underlying representations as in (7:3) and (7:4).

(7:3) /pɪstən/

(7:4) /sɪstərn/

Here /r/ contrasts with its absence: by adding /r/ to an existing string of phonemes you get a different word. If the pair of words had been *idea* and *idiot*, then potential surface forms would be as in (7:5) and (7:6).

(7:5) [aɪdɪə]

(7:6) [ɪdɪəʔ]

The corresponding underlying representations could be as in (7:7) and (7:8).

(7:7) /aɪdɪə/

(7:8) /ɪdɪət/

Here /t/ (realised as [ʔ]) contrasts with its absence rather than specifically with another phoneme, as would be the case with *idiot*∼*idiom*. However, notwithstanding the choice of examples, clearly

rhotic accents do have a contrast between /ə/ and /r/. Is the synchronic contrast between /r/ and /ə/ enough to prove that *r* cannot be used as a hiatus filler? By the same argument, (7:7) and (7:8) do not show that [ə] and [ʔ] are in complementary distribution. This conclusion seems obvious: it is not an intuitive assumption to think that [ə] and [ʔ] are allophones of a single underlying phoneme. However, I do not see what relevance this has for the possibility of [ʔ] being used as a hiatus filler. The idea of [ə] and [ɹ] being surface realisations in complementary distribution and having a common underlier is a plausible explanation for the presence of intrusive-*r* in non-rhotic speech. However, the fact that in rhotic dialects [ə] and [ɹ] are *not* in complementary distribution does not rule out the use of *r* as a hiatus-filling segment.

Schwa can be motivated by separate processes, as indicated by Giegerich (1999: 284n): 'Schwa has another (synchronic) source exemplified by items such as *little*, *bottle*, *button*, where it does not alternate with full vowels but is governed by low-level epenthesis rules or occurs in free variation with syllabic sonorants. This 'prosodic schwa' is irrelevant to the present discussion'. We know that *r* can be motivated by separate processes, as exemplified by the difference in Tyneside English between *r* resulting from an *r*-sandhi process, which is variable in its surface realisation, and *r* resulting from a T-to-R rule, which does not vary in its surface realisation (McMahon 2009: 104). Similarly, [ʔ] can be motivated by different processes: it can be an allophone of /t/ or it can be used as a hiatus filler.

This idea is important because there is recent evidence that [ʔ] is being used as a hiatus filler in some varieties of English, and that these varieties can also quite happily have [ʔ] in a word-final coda. Britain & Fox (2009) show that a levelled use of [ʔ] to fill hiatus is developing in London 'non-Anglo' English, and in a non-Anglo spoken in Bedford. This use of [ʔ] is connected to a reduction in allomorphy of the definite and indefinite article, such that [ðə] and [ə] are used even prevocalically: the resulting hiatus here is filled with [ʔ]. However, they also present examples where [ʔ] is used after high vowels instead of a glide, and after non-high vowels in contexts which would be expected to be sites of linking or intrusive-*r*, such as *their own hood* [ðɛə ʔ əʊn hʊd] and *gonna end up* [gɒnə ʔ ɛnd ʌp][1](Britain & Fox 2009: 194).

What is the phonological status of the [ʔ] given in these transcriptions? Britain & Fox give an example which shows that [ʔ] is an allophone of /t/ for these speakers: *the older lot*

1. This is in fact the only potential context of intrusive-*r* they give, and I note that McCarthy (1993) shows that intrusive-*r* does not occur in this reduced function word context in Massachusetts speech. However, there is no reason to think that non-Anglo London speech shares this constraint on intrusive-*r*.

[ðə ʔ əʊldə lɒʔ]. The hiatus-filling instances of [ʔ] are orthographically presented with spaces on either side rather than being made to look like the glottal stop belongs to the preceding or following words. If the principal of filling onset positions applies, then it belongs to the onset of the following syllable, as would be the case for an intrusive-*r*. However, the fact that [ʔ] can result from different processes sets up pairs such as *gonna* and *sonnet*. Given that this is a variety in which *t*-glottalling is usual (so [ʔ] is an allophone of /t/ in 'free' variation with [t]), then the pair of connected speech surface realisations in (7:9) and (7:10) require explanation.

(7:9) *sonnet ends with*

[sɒnəʔ ɛndz wɪð]

/sɒnət ɛndz wɪð/

In (7:9), a surface [ʔ] is resyllabified into onset position in this connected speech context. In a parallel example with *gonna*, [ʔ] is epenthesised to fill hiatus.

(7:10) *gonna end up*

[gɒnə ʔ ɛnd ʌp]

/gɒnə _ ɛnd ʌp/

The examples in (7:9) and (7:10) show that a speaker can: 1) have [ə] and [ʔ] as realisations of separate phonemes; 2) be able to have [ʔ] in a word-final coda position, as in *sonnet*; 3) be able to use [ʔ] as a hiatus-filling segment, as in *gonna end* [gɒnə ʔ ɛnd ʌp].

I suggest that a rhotic speaker could: 1) have [ə] and [ɹ] as realisations of separate phonemes; 2) be able to have [ɹ] in word-final coda position, as in *locker*; 3) be able to use [ɹ] as a hiatus-filling segment, as in *Locka is a hamlet in Lancashire* [lɒkəɹɪz…].

Giegerich (1999: 196) appeals to a phonemicist argument involving complementary distribution in order to explain the lack of *r*-intrusion in rhotic accents. However, if the glottal stop data are correct and if the use of [ʔ] as a hiatus-filler can be paralleled to the use of [ɹ], then even in this phonemicist model with phonemes and allophonic realisations, there is nothing explicitly ruling out intrusive-*r* in the speech of rhotic speakers. There is the question of why speakers would start to use *r* as the epenthetic segment: this reasoning is part of the argument restricting intrusive-*r* to non-rhotic speech. Non-rhotic speakers have a plausible reason to reanalyse etymologically *r*-less words to have the same underlying structure as etymologically *r*-ful words. However, as is the case with the use of [ʔ] as a hiatus filler, it could be that the choice of hiatus-filling segment has nothing to do with a parallel between words with or without

a particular segment in their etymology, and everything to do with resolving an awkward vowel hiatus by the best means possible. Uffmann (2007) shows that *r* can be the most optimal choice for filling hiatus in some varieties; his model would need to be adjusted to account for the levelled use of [ʔ] as a hiatus filler as reported by Britain & Fox (2009).

This does not mean that this account based on [ə] and [ɹ] having a common underlier is wrong; it fits the data for non-rhotic speech. However, my data mean that rhotic speech requires a different model. This in itself is not a problem. McMahon argues that she 'must of necessity propose [r]-Insertion in varieties with linking and intrusive [r], and [r]-Deletion in dialects with linking only' (2000: 263). Different varieties may require different phonological accounts for the 'same' surface feature. Likewise, intrusive-*r* as a hiatus-filling strategy for a rhotic speaker might be motivated by a different set of processes than apparently the same surface intrusive-*r* in the speech of a non-rhotic speaker.

Of course, vowel hiatus can result after vowels other than schwa, and again there is evidence for this in the speech of my rhotic East Lancashire speakers. For non-rhotic speakers, various models have been proposed, including Giegerich's argument that surface [ɑ, ɔ] are stored as diphthongs underlyingly, with a second element that surfaces as either an *r* (where it can fill a syllable onset) or as length on the vowel (in non-prevocalic instances). This means that these other vowels are analysed in exactly the same way as schwa. For rhotic speakers, the assumption is that surface [ɑ, ɔ] are underlyingly /ɑ, ɔ/. However, the fact remains that rhotic speakers are also faced with vowel hiatus in examples such as *law and order*. Although most varieties may just adopt a different hiatus-filling strategy (perhaps by using some sort of transitional glide, or by using a glottal stop), there is no reason in principal why rhotic speakers should not fill this hiatus with *r*: a surface [ɹ] is an appropriate candidate for this hiatus-filling role (as argued by Uffmann 2007), despite the facts that [ɹ] can be a realisation of /ɹ/ and that /ɹ/ can occur in syllable codas. Just as a surface schwa can be the result of low level epenthesis rules, a surface *r* in intrusive position can also result from a similar process, and not require reanalysis of underlying representations.

7.6 The nature of *r*-sandhi

Many of the phonological accounts I have discussed are based on diachronic change and the present-day phonemic inventories of non-rhotic varieties of English. The presence of intrusive-*r* in non-rhotic varieties is argued to result from a collapse of contrast between *r*-less and *r*-ful

realisations, and this allows the sort of proposal made by Giegerich (1999), that [ə, ɹ] are two realisations, in complementary distribution, of a common underlier. This account is an explanation of why non-rhotic varieties have intrusive-*r*, but emphasises only the parallel distribution of contrastive segments, or the complementary distribution of non-contrastive segments. It does not approach the problem from a connected-speech perspective, which would note that vowel hiatus is difficult to articulate and that filling the hiatus is a problem which would affect all speakers, including those rhotic speakers for whom the set of potentially hiatus-causing words is restricted to etymologically *r*-less words (as etymologically *r*-ful words would have a surface *r* for these speakers regardless).

The accounts which do suggest (albeit in brief single-sentence asides) that intrusive-*r* could feature in the speech of rhotic speakers, are perhaps more focused on connected speech phenomena and the prosodic structure of syllables than the strict phonemicist approach of establishing segmental contrast by finding parallel distribution in minimal pairs.

The potential for phonologists to focus mainly on segmental phonology or mainly on prosodic phonology has been noted by McMahon (2007: 160): 'phonologists have a strong tendency to focus on either segmental issues (properties of vowels and consonants, phoneme systems, feature theory, and morphophonological alternations), or on prosodic ones (stress, intonation, and syllables)'. Indeed, in her summary of recent textbooks for first year undergraduates, she notes that 'Carr (1999) devotes 66 pages out of 148 to syllables, stress, rhythm, connected speech, and intonation, while ... in McMahon (2002) only two chapters out of ten involve anything above the level of the segment' (McMahon 2007: 160). Although intrusive-*r* is typically labelled as a segmental issue (as the name 'intrusive-r' suggests), it is also by definition a connected speech phenomenon. Given the difference in approach noted by McMahon, it is perhaps not a coincidence that the Carr textbook claims that 'there is no reason why [intrusive-*r*] should not spread to rhotic accents' (1999: 127), while McMahon's textbook maintains that intrusive-*r* is a feature of non-rhotic varieties (2002: 129). A focus on the difficulty of articulating hiatus arising from the second syllable having an empty onset (Carr) makes no reference to the fact that rhotic speakers can have /ɹ/ in syllable rhymes, or to the $r \sim \varnothing$ alternations produced by non-rhotic speakers, and hence does not predict that *r*-intrusion is necessarily restricted to non-rhotic speakers; a focus on the $r \sim \varnothing$ alternations in historically *r*-ful words which lead

to reanalysis of historically *r*-less words (McMahon) clearly does predict that *r*-intrusion is restricted to non-rhotic speakers.

Part of the argument typically used to justify the claim that *r*-sandhi is restricted to non-rhotic speech involves diachronic change. Trudgill (2000: 58) writes: 'But of course it is a process which occurs only in the r-less accents. R-ful accents ... do not have this feature because they have not undergone the loss of 'r' which started the whole process off in the first place'. Historical evidence for the presence of phenomena like intrusive-*r* is clearly difficult to find: 'the writing systems of most languages do not consistently reflect the output of sandhi rules or related prosodic processes' (Fortson 2010: 166). However, just as there is some orthographic evidence for sandhi phenomena in some writing systems such as Sanskrit, there is occasionally evidence in non-standard orthography. Fortson notes that 'Greek and Latin inscriptions frequently show evidence of sandhi rules and prosodic groupings that are not reflected in the more rigid orthography of the standard literary tradition' (2010: 166). Where there are historical spellings and overt comment which may indicate the presence of intrusive-*r*, phonologists argue over the significance of the spellings and whether they precisely indicate intrusive-*r* (cf. Harris 1994: 252–3 and McMahon 2000: 259–262). And still, by maintaining a particular focus, phonologists can accept or dismiss what little historical evidence there is: McMahon (2000: 260) argues that Sheridan's spelling of 'winder, Dorinder' does not refer to non-prevocalic instances (i.e. hyperdialectal-*r*), and therefore this is not evidence that intrusive-*r* and linking-*r* could be separate developments, with intrusive-*r* developing (in rhotic speakers) before the loss of rhoticity and development of linking-*r*. This argument assumes that if intrusive-*r* and linking-*r* occur only prevocalically they are the same process; it does not address the fact that intrusive-*r* could be a hiatus-filling strategy separate from the *r* $\sim \varnothing$ segmental alternation in non-rhoticity/linking-*r* which happens to involve the same surface sound [ɹ].

This focus is not merely an idiosyncrasy of different writers; the theories adopted by these writers also reflect the stance taken. As McMahon notes, 'over and over again, we find that theories, and individuals work for, or on, either (a) features and segments; or (b) syllables, rhythm and pitch' (2007: 162). In her discussion of prosody and language disorder, McMahon discusses research by Snow that shows that children with specific language impairments may be unaffected in their prosodic development, and that 'lexical and prosodic levels of phonology are independent and dissociable' (Snow 2001: 582, cited in McMahon 2007: 174).

McMahon's textbook mention of intrusive-*r* includes the observation that 'producing two vowels side-by-side appears to be rather difficult for speakers, and an intrusive consonant may allow more fluid and less hesitant speech. Many of these [connected speech] processes therefore have a similar rationale, in making life easier for speakers, and allowing speech tempo to be kept consistently fast.' (2002: 129). McMahon still labels this as segmental phonology: the section is called 'Segmental phonology of the phrase and word'. However, it is surely true that the rationale of making life easier for speakers applies just as much to rhotic speakers as it does to non-rhotic speakers.

Britain and Fox state that speakers have a range of strategies for hiatus resolution, 'strategies which are determined by a range of linguistic contextual factors ... which ... are often the result of relics of and residues of (often unconnected) historical processes that have been underway in the varieties in question for centuries' (Britain & Fox 2009: 178). Now, by 'unconnected' Britain and Fox are referring to the historical origins of definite and indefinite article allomorphy ([ə] ∼ [ən], [ðə] ∼ [ðiː]) and the diachronic loss of rhoticity typically argued to be the cause of intrusive-*r* development in present-day non-rhotic accents. But the word 'unconnected' prompts a thought about connections: what is the nature of the connection between *r* as a hiatus-filler and the distribution of the phoneme /r/? Diachronically, this seems clear for the development of accents which are non-rhotic and *r*-intruding. But vowel hiatus is a problem for rhotic speakers too: if particular rhotic speakers do use intrusive-*r* as a hiatus filler, then this specific use of intrusive-*r* would indeed be 'unconnected' to a historical loss of rhoticity because the variety spoken by these speakers has not yet undergone that loss.

McMahon (2009) discusses English /r/ in terms of synchronic issues of interest (rhotic versus non-rhotic accents, resulting differences in vowel inventories, *r*-sandhi), and in terms of its diachronic issues (pre-*r* breaking, loss of rhoticity). She talks of 'an additional set of surface [r]s which are not found in rhotic accents' (2009: 100). Although she acknowledges the variable nature of intrusive-*r* in accents where it occurs, citing sociolinguistic stigmatisation, she maintains that this variability is restricted to non-rhotic speakers because rhotic speakers simply do not produce intrusive-*r*: 'the main division is between rhotic varieties on the one hand, and non-rhotic ones with both linking and intrusive [r] on the other' (2009: 100).

She then gives an account of the historical sound changes that led to the loss of rhoticity and the emergence of linking-*r* as a sandhi phenomenon (rhotic accents have surface *r* in these

contexts, but onset-filling resyllabification is all that is required to account for it: the term 'linking-*r*' is redundant for rhotic accents). The next step is to account for intrusive-*r*, and McMahon notes that the 'almost total environmental overlap is highly unlikely to be accidental, and we should therefore look first for a source of intrusive [r] in the linking [r] pattern' (2009: 102). Having noted that her preferred account involves an *r*-insertion rule, she notes that non-rhotic speakers do not distinguish underlyingly pairs such as *spar* and *spa*, *soar* and *saw*, or *Lear* and *Leah*. 'If these are not kept separate by presence versus absence of underlying /ɹ/, and if [r]-Insertion is productive, then we would expect that process to be extended to the second member of each pair. This is precisely what we find, in *spa*[r] *experience*, *saw*[r]*ing* and *Leah*[r] *isn't going*; and this is the source of intrusive [r]' (McMahon 2009: 102–3).

This account works for non-rhotic varieties, but some of my East Lancashire speakers are rhotic but also have intrusive-*r*, which only occurs in hiatus positions following [ɑ, ɔ, ə, ɜ] (and in fact also [ɛ] in the case of *yeah*, although the status of this 'word' is somewhat uncertain). These speakers do not have an [r]-Insertion rule that emerged through alternations: they appear to have a hiatus-filling strategy that happens to involve use of a surface [ɹ]. As they do not have linking-*r*, linking-*r* cannot be the source of their intrusive-*r*.

McMahon notes that North Eastern English varieties of English have intrusive-*r* and also a /t/ to *r* rule. Both result in surface [ɹ], but whereas linking and intrusive-*r* are variable, the output of /t/ to *r* is obligatorily present on the surface. This difference is explained thus: 'in an insertion account of linking and intrusive [r], the Insertion rule and the /t/ to [r] rule are quite separate and their outputs would not necessarily be expected to behave in the same way' (McMahon 2009: 104). This situation could well be analogous to the presence of [ʔ] in 'non-Anglo' London English. For these speakers, the outputs of a /t/ to [ʔ] rule and the use of [ʔ] as a hiatus filler are also quite separate. In the case of rhotic speakers who have also developed use of [ɹ] as a hiatus filler, this hiatus filling use of [ɹ] and the [ɹ]s that result from underlying coda /ɹ/ are also quite separate, and do not have to behave in the same way, or result from the same process. A hiatus filling [ɹ] does not have to result from either an underlying /ɹ/ or from an insertion rule that is motivated by a loss of contrast between pairs such as *Lear*/*Leah*. McCarthy notes that the epenthesis of [ʔ] in onsetless syllables in American dialects may be restricted to phrase initial position, 'perhaps more for phonetic than for phonological reasons' (McCarthy 1993: 191n). I am not arguing that hiatus-filling *r*-intrusion should be

outside phonology, but that it could be the result of a separate phonological process from one motivated by the $r \sim \varnothing$ alternation that non-rhotic speakers have in *sore*/*saw*.

However, this solution does leave the issue of why intrusive-*r* follows only [ə, ɑ, ɔ][2], which is as true for my rhotic speakers as it is for non-rhotic *r*-intruding speakers. McMahon says that some accounts have attempted to make these into a set of vowels with 'some common property, perhaps also shared with [ɹ]' (McMahon 2009: 104) and notes that Broadbent's account has some difficulty in accounting for why the spread of an A element would cause production of [r], and that Kraemer's (2005) account does not quite account for why low vowels and [r] pattern together. The answer seems to be (according to McMahon) that the preceding vowels 'need not share any property in synchronic terms, but are easily explicable through their historical role in the loss of non-prevocalic [r]' (McMahon 2009: 104).

Now, if McMahon is right and the feature-spreading accounts of intrusive-*r* are flawed, but we still have to account for East Lancashire rhotic speakers having intrusive-*r*, then we have no option but to invoke contact: rhotic speakers come into contact with non-rhotic and *r*-intruding speakers, and they notice that these speakers insert an [ɹ] after [ə, ɑ, ɔ] where these precede a hiatus. This contact account does rely on the people with whom my rhotic speakers come into contact already having developed intrusive-*r*; that development could be explained by the historically-conditioned rule inversion account proposed by McMahon. But the point is that, as Carr (1999) notes, there is no reason why this intrusive-*r* should not spread to rhotic varieties, and my East Lancashire data show that this is indeed what has happened.

7.7 Use of *r*-sandhi in arguments about the nature of phonology

People have used the patterning of *r*-sandhi to make big claims about the nature of phonology. It has been used to argue for models of phonetically-rich exemplar storage (Hay & Sudbury 2005). It has been discussed using OT (e.g. McCarthy 1993, Uffmann 2007), and could also be used to argue against OT: McCarthy's (1993) need to include a rule in his account is 'equivalent to giving up on the enterprise [of OT]. Data that cannot be dealt with by OT without recourse to rules are fatal counterexamples to the OT research programme' (Halle & Idsardi 1997: 337–8). It may be that some sort of combination model is needed to account for aspects of the development of *r*-sandhi. While certain analyses in terms of frequency may suggest that an exemplar-based model is needed, other patterns (such as the contexts where you do and do not find *r*-sandhi)

2. It also follows [ɜ, ɛ] with the caveat that any proposed relevant 'words' have a marginal lexical status.

point to underlying structure, not just phonetic variation. Bermúdez-Otero (2006) explains this clearly. He mentions that an approach which balances modular and exemplar-based models is 'worth pursuing' (2006: 18).

In regard to the East Lancashire data, one issue is that the observable surface data is variable: different speakers produce different levels of surface coda-*r*. This has to be analysed in some way: do these different speakers all have the same underlying system, or is that variable too? Bermúdez-Otero (2006: 8n) notes that 'gradient variation in the phonetic realization of dark [ɫ] is not incompatible with a categorical distinction between light [l] and dark [ɫ]'. Here, two allophones of a single phoneme are in complementary distribution, but one of these allophones is itself realised variably. In the case of the distinction between rhotic and non-rhotic speakers, there is evidence for a categorical difference in that non-rhotic speakers do not have underlying coda-/r/ where rhotic speakers do, but the rhotic speakers vary in their realisation of *r*, including sometimes not realising it phonetically.

7.8 Phonological accounts revisited

While arguments for and against different accounts of *r*-sandhi in non-rhotic varieties continue to be made with no single model winning out convincingly, it is clear that different factors come into play when accounting for the presence of intrusive-*r* in a rhotic variety. For a start, in such a variety intrusive-*r* is clearly a separate phenomenon from linking-*r*. Linking-*r* does not exist as a sandhi process for these speakers, so accounts that argue that intrusive-*r* is an extension by analogy of an existing linking-*r* sandhi process do not work for these speakers.

One approach is to adopt one of the spreading models of intrusive-*r* in which a feature of the preceding vowel spreads to fill the empty onset position of the next syllable. This analysis would be a reasonable fit with the observed surface data, in that this account does not ban rhotic speakers from producing intrusive-*r*. But the objections made to spreading accounts of *r*-sandhi in RP or other non-rhotic accents still apply. What is it that spreads, and why should this spreading produce [ɹ]? Furthermore, a notable observation about the presence of intrusive-*r* in my data is just how variable it is. Even the speakers who are phonologically non-rhotic, and who therefore 'should' have a fully productive *r*-sandhi system, do not produce intrusive-*r* all the time. Far from it: they use glottal stop epenthesis in many instances of potential intrusive-*r*, as do the phonologically rhotic speakers who have a mixture of tokens of [ʔ] and [ɹ] in intrusive contexts.

Another possibility is to deny the *r* in rhotic speakers' intrusive-*r* the phonological status of a realisation of a phoneme. This is not a new idea: the 'insertion' explanation of intrusive-*r* explicitly argues that identical surface forms of *r* may be 'described as originating in two ways' (Johansson 1973: 66): either as a realisation of an underlying phoneme or as an inserted segment with no underlier. As Johansson puts it: 'despite the phonetic identifiability of the hiatus and non-hiatus *r*-sounds, their phonematic evaluation must be basically different' (1973: 66). However, if we abandon the need to regard intrusive-*r* and linking-*r* as the same process, which is clearly justified in a dialect which does not have a linking-*r* process, then the need to fill hiatus, rather than analogy with linking-*r*, becomes the motivation for intrusive-*r*.

If hiatus-filling is the priority, this use of a surface *r* sound is an articulatory effect, in the same way that the non-Anglo London English speakers use [ʔ] to fill hiatus without it having to have an underlier in a phonological derivation. In contrast to this hiatus-filling *r*, the *r* that these speakers have in syllable coda position does have an underlier. This does not, however, explain why sometimes [ɹ] appears from nowhere, but in the same environment on other occasions [ʔ] appears. Furthermore, there is some objection to this separation of lexical *r* from hiatus-filling *r* by Heselwood (2007), who notes that a subject with impaired speech produces the same (unusual) phonetic form of *r* in both cases: '[i]f linking /ɹ/ were merely a hiatus-breaker, as argued by a number of phonologists . . . then it is difficult to explain why speakers use the same /ɹ/-variant for linking /ɹ/ as they use for word-internal /r/, especially when the variant in question is a highly unusual one' (2007: 599).

A 'floating sound' approach, as given in Harris (1994), does not in principal rule out rhotic speakers from having intrusive-*r*, but again the floating *r* has to come from somewhere, and there has to be a reason for speakers to have it in an underlying representation. For non-rhotic speakers the loss of contrast between e.g. *Lear* and *Leah* provides a reason; for rhotic speakers a reason is not obvious.

A model which does not present this problem is proposed by Uffmann (2007). As discussed in Section 2.4.3, his account argues that *r* is the optimal segment to fill hiatus positions after non-high vowels, and that therefore intrusive-*r* can be seen as a 'phonologically natural process' Uffmann (2007: 451). Interestingly, Uffmann notes that his model does not ban rhotic speakers from producing intrusive-*r*, and discusses this observation as a potential counterargument to his model.

> The key question to me is whether a hypothetical rhotic dialect with intrusive [r] (an unattested dialect) should be ruled out on principled grounds, as a synchronically impossible dialect, or whether it simply is a diachronically unlikely dialect. I suspect that the latter is the case. I do not see why it should be computationally or physically impossible for speakers of a rhotic accent to use [r] as an epenthetic segment as well. The question rather is why they should start doing so. (Uffmann 2007: 468).

Uffmann argues that without the diachronic loss of coda /r/ and resulting reanalysis 'there is no motivation for speakers to alter their grammar in order to have a hiatus breaker for non-high vowels' (2007: 468). However, if contact with *r*-intruding speakers is widespread and frequent, as indeed it is for the East Lancashire speakers, then I argue that this could provide the necessary motivation. The presence of intrusive-*r* in East Lancashire rhotic speakers is therefore a sociophonological phenomenon. *Socio* because it depends on sociolinguistic contact for its motivation; *phonological* because it is a regular and phonologically conditioned process (these speakers do not insert *r* just anywhere in their speech, but only in sandhi environments following non-high vowels), and this process can be accounted for in a coherent phonological model. Uffmann's model accounts for intrusive-*r* in speakers' phonological systems, regardless of whether or not they are rhotic. This seems to me to be an argument in its favour: adopting the other models of *r*-sandhi discussed in this thesis requires that a special case be made for the East Lancashire speakers; that they are somehow doing something that is not phonological. Uffmann's model allows for a unified account.

7.9 Possibilities for future research

As they stand, my results show that there are indeed some speakers who produce coda-*r* and also produce intrusive-*r* in hiatus contexts. Such a dialect is not 'unattested' (Uffmann 2007: 468), but exists in present day East Lancashire. This finding merely lends weight to existing accounts of such varieties by Shorrocks (1998) and Hay & Sudbury (2005). It also provides some data for Harris' claim that there is 'plenty of evidence of intrusive-*r* in rhotic varieties' (1994: 253); data which clearly concerns sandhi intrusive-*r* rather than potentially reflecting non-sandhi hyperdialectal-*r* as his own historical examples do. The rhotic-and-*r*-intruding dialect of East Lancashire is a rare phonological system, but not unique.

The present study has a geographical and apparent time approach to investigating change in rhoticity and development of intrusive-*r*, and there is clearly the opportunity to investigate these

changes in the future, to see whether they do progress as they did historically in for example New Zealand speech. However, there is also opportunity to investigate more specifically the phonological systems of those few speakers, chiefly found in Rossendale, who are 1) phonologically rhotic; 2) realise surface coda-*r* more frequently than they do not realise it; 3) produce increasing levels of intrusive-*r*. These particular speakers are particularly interesting phonologically. While social contact may well have caused them to begin to use intrusive-*r*, the fact is that they robustly have both coda-*r* and intrusive-*r* in their current phonological systems. My investigations of potential phonological conditioning factors were constrained somewhat by the cross-dialectal comparative approach I took in carrying out this investigation. A future project focussing on these particular speakers should investigate in more precise detail the influence of phonological factors, such as the preceding and following segments. These speakers did produce a very small number of tokens of hyper-dialectal *r*: this should be investigated more explicitly: are these cases merely sporadic one-offs, effectively speech errors, as I have claimed in ignoring them here? Or are there more systematic patterns at play? Existing research (Austin 2007, Vivian 2000) has found more extensive use of hyperdialectal *r* in the East Lancashire island of rhoticity: this disparity is something that could be investigated further.

Chapter 8

Sociophonology as a means of accounting for variation and change

This chapter addresses RQ7: 'How useful is a sociophonological approach to modelling the kind of variation found in East Lancashire?' So far, I have analysed and discussed my East Lancashire data in order to consider the roles played in sound change by both (1) dialect contact and sociolinguistic conditioning, and (2) structural properties of phonological systems. Both of these factors have affected the patterns in my data. There are clear patterns of change in both rhoticity and *r*-sandhi across the different localities in my survey and across apparent time. These patterns match expectations based on dialect contact and the potential influence of a large conurbation on surrounding areas. However, the social factor of speaker contact does not explain why levels of rhoticity and intrusive-*r* are correlated such that lower levels of (surface) rhoticity match higher levels of intrusive-*r*. This issue requires consideration of the phonological systems of the speakers involved. Yet concentrating solely on predictions of models of phonological systems does not explain why some phonologically rhotic speakers should begin to produce intrusive-*r*, when most do not: I have data from some rhotic speakers who have started to produce intrusive-*r*, but the huge number of rhotic speakers of General American and the slightly smaller numbers of speakers of other rhotic varieties such as Scottish Standard English or Irish English suggest that these Lancashire speakers are very much the exception to the rule. Focusing on the predictions of phonological systems certainly does not explain why the most robustly rhotic speakers in my survey, who produce high levels of surface coda-*r*, should begin to produce intrusive-*r*. The sociolinguistic and phonological approaches are summarised briefly below, before the combined sociophonological approach is argued for.

8.1 Why dialect contact and sociolinguistic conditioning are not sufficient to account for changes such as the development of *r*-sandhi

There are certain patterns in my results which suggest that dialect contact can affect (and effect) linguistic change. For example, there is a change in the geographical distribution of rhoticity in the younger speakers' data compared to the older speakers' data. Where the older speakers in Prestwich, Bury and Ramsbottom, considered in that order, show a gradual increase in surface tokens of coda-*r*, the younger speakers in these three places are essentially non-rhotic. This change matches the 2001 Census data on commuting patterns: all three of these places show a focus of commuting journeys south into Manchester (with some secondary focus on Bury as a smaller urban centre). Urban Manchester speech is non-rhotic; speech to the north of these three localities has been reported to be an island of rhoticity. The social focus of commuting to work, as well as the impressionistic qualitative data gained from my interviews, shows that the younger speakers are more likely to come into prolonged contact with non-rhotic speakers from the big city than they are with rhotic speakers from the comparatively isolated island of rhoticity in Rossendale and Accrington. In these cases, contact with the non-rhotic majority population helps to lead to a general loss of rhoticity and to a development of *r*-sandhi. Young Ramsbottom, Bury and Prestwich speakers will hear both of these linguistic features in the speech of urban Mancunian speakers and high levels of contact will lead over time to their adoption by speakers from Bury and Ramsbottom, places where there was evidence of a traditional, rhotic, system in the data for older speakers.

However, contact also seems to produce contradictory effects. Although Rossendale is the most rural and isolated of my five localities, there is still evidence of contact with the non-rhotic majority. Indeed, now that young Ramsbottom speakers are really part of this non-rhotic majority, you could argue that the tide has come in to the traditional island of rhoticity: the surrounding sea of non-rhotic speakers is even closer than it was traditionally. In regard to rhoticity, this seems to have produced an opposite effect to that experienced in Ramsbottom. Younger Rossendale speakers are now *more* consistently rhotic than their older equivalents. This change in itself is not unique: where a local vernacular is under threat from a supra-local variety, there is sometimes evidence of a fight-back, such that particular features of the local variety are emphasised as being particularly locally significant (Britain 2009: §2.6). This resistance leads to hyperdialectalisms, which are typically argued to be a last gasp before the local variety gives way to a levelled

supra-local variety. What is more surprising is that, along with increasing levels of coda-*r* production, intrusive-*r* also increases in the speech of younger Rossendale speakers. Previous arguments have been made that non-etymological *r* production has been known to increase along with etymological coda-*r* production as part of this last gasp before eventual dialect attrition. In these cases, such as have been found on the rhotic/non-rhotic border in parts of the South West of England, *r* in general becomes a sort of local identity symbol (Trudgill 1986: 75), and it seems to be produced wherever it is feasible to do so, leading to the production of examples such as *sauce* [sɔɹs]. This can be understood as an active reaction against the encroachment of non-rhoticity from surrounding varieties.

However, the Rossendale situation is not like this. Younger Rossendale speakers do not show increased levels of hyperdialectal *r*. They do show an increase in intrusive-*r* in sandhi contexts, and only in these contexts. This pattern is difficult to reconcile with a reaction against incoming non-rhoticity. If anything, these speakers seem to have accurately adopted a feature of the incoming varieties; 'accurately' in that the precise conditioning context is adopted (after [ɑ, ɔ, ə] in sandhi environments), as well as the linguistic outcome (production of non-etymological *r*). So, contact with the non-rhotic majority of speakers has apparently led to reinforcement of one part of the traditional system (rhoticity) but also to accurate adoption of part of the incoming supra-local system (intrusive-*r* in sandhi contexts). This is surprising, and suggests that only considering the potential influence of dialect contact is not enough to account for the data. Something else is required, and that is an explanation of the language internal, phonological processes involved in the loss of rhoticity and the development of *r*-sandhi.

8.2 Why phonology alone is not sufficient to account fully for changes such as the development of *r*-sandhi

Much of the literature on intrusive-*r*, which (by definition according to many writers) deals with non-rhotic dialects, emphasises the diachronic processes of loss of rhoticity and development of *r*-sandhi. These phenomena are shown to be correlated, and to be in a fixed chronological order: rhoticity must be lost before *r*-sandhi can develop. However, Hay & Sudbury (2005) show that there is a chronological overlap: levels of surface-realised coda-*r* negatively correlate with levels of surface-realised intrusive-*r*, and while this fits the macro view that intrusive-*r* follows from loss of rhoticity, in micro terms, a single individual speaker can produce both phenomena. Now this requires some explanation in terms of phonological systems: is a speaker who realises only

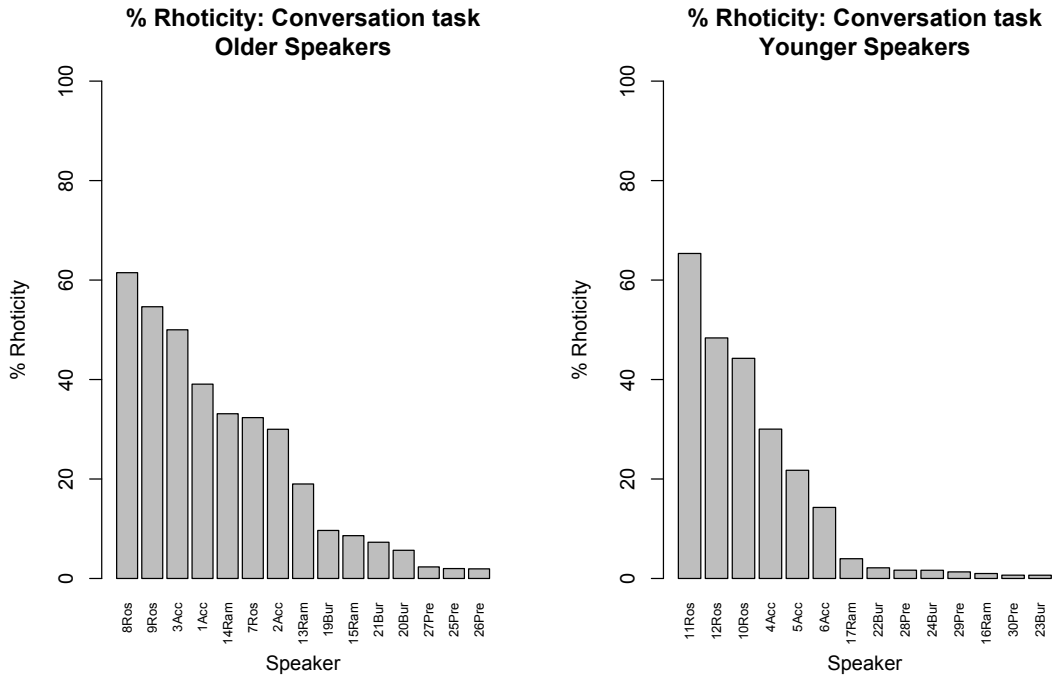


Figure 8.1
Individual speakers' rates of rhoticity: conversation.

some tokens of coda-*r* still rhotic? How low does the level of surface coda-*r* have to be before the speaker counts as a non-rhotic speaker? These questions are impossible to answer definitely, but some patterns do emerge from my results. Even the most consistently rhotic speakers do not realise coda-*r* 100% of the time. As the percentages in Tables 5.16 (p. 151) and 5.17 (p. 152) show, around 75% is an approximate ceiling (although in one task, speaker 12Ros does realise 91.1% of possible coda-*r*s).

The two bar charts in Figure 8.1 show the percentages of realised coda-*r* in the conversational data for all speakers, ranked in descending order and split into older and younger age groups. There is clearly a different pattern in the older and younger speakers' data, in that more of the younger speakers are consistently non-rhotic, whereas fewer of the older speakers are. The speaker labels show that this matches localities: the older three Prestwich speakers are non-rhotic, whereas in the set of younger speakers the non-rhotic group includes Prestwich, Bury and Ramsbottom speakers. However, the geographical spread is not the focus here; I am interested in how these variable levels of surface *r* match the discussion on the wider literature of rhotic versus non-rhotic speakers.

Speakers with some surface coda-*r* must have a deletion rule (or whatever process the phonological theory requires, such as a ranking of constraints). They do not have an insertion rule, because if they did they would not be able to tell where to insert an etymological coda-*r* from other identical contexts where an *r* is not etymological. They can. They do not produce hyperdialectal unetymological *r*. However, when 'some coda *r*' is down to under 5%, and in the case of many of my speakers around 1%, I think it is not unreasonable to assume those are sporadic instances. Remember of course that even in RP it is possible for surface pre-consonantal *r* to be produced: Cruttenden (2001: 208) gives the example of elision of schwa in e.g. *parrot*, *barrel*, which 'may result in the introduction of pre-consonantal /ɹ/ into RP'. Similarly, Gussmann (2002: 41) gives the example of *garrulous*, although the labelling of [j] as a semi-vowel suggests that this is not unambiguously a pre-consonantal *r*. So, if the East Lancashire data seem amenable to being split at this low percentage level of surface rhoticity (under 5%) into phonologically rhotic versus non-rhotic then that is the split I shall make.

Accounts which maintain a deletion rule even for uncontroversially consistently non-rhotic varieties such as RP seem to be more compatible with the range of surface variation in coda-*r* in my data. If the deletion rule varies in its application then it can vary continuously right up to 100% application (which would of course result in consistent non-rhoticity): there is no need to propose an abrupt and severe change involving reanalysis of underlying representations. However, if sandhi intrusive-*r* is to fit with this model, and be explained in the same framework, then there does have to be an abrupt change in the underlying representation of non-etymologically *r*-ful words. Given that in this model 'rhoticity' is essentially the variable (non)application of a deletion rule, the motivation for an abrupt change in the underlying representation of words such as *law* is not clear — certainly, it is not as clear as it is in textbook accounts of a deletion model in which deletion of underlying non-prevocalic etymological coda /ɹ/ does occur 100% of the time.

If a rule-inversion account is argued for, then there must be a level of surface-*r* production at which speakers change from variably deleting an underlying coda /ɹ/ to not having a coda /ɹ/ in the underlying representation. Logically, within the phonological system of an individual speaker, this can only be at 0% of realised surface coda *r*, because any surface coda-*r* tokens would have to be inserted, and if the *r*-less/*r*-ful contrast had been lost, then speakers would insert *r* in unetymological positions, which they do not. However, the cross-generational reanalysis which

occurs in a community of speakers may take place even though older speakers still realise some coda-*r* tokens. Furthermore, as discussed above, a certain amount of 'surface noise' should be allowed for, which means that the level of surface coda *r* production below which speakers 'become' non-rhotic is somewhere under 5%. However, the question remains as to what triggers this abrupt reanalysis so that two changes occur: underlying representations are restructured and the process of deriving a surface form is inverted? Textbook accounts propose that the presence of intrusive-*r* explains this, but there is plenty of evidence in my data that speakers with levels of surface coda *r* far higher than 5% produce intrusive-*r*.

Phonological accounts which move away from the approach of modelling intrusive-*r* as a process resulting from analogy with words with historical coda-*r*, and instead focus on the hiatus-filling function of intrusive-*r* get round this problem (and indeed, this in itself is regarded as a potential objection by Uffmann 2007: 468). However, in this approach, the phonology cannot explain why intrusive-*r* should begin develop.

Phonology can model *how* speakers can be phonologically rhotic yet still produce intrusive-*r*, but it cannot predict that such a change will happen, or even explain *why* it has happened where we have evidence for it. There needs to be a trigger to cause intrusive-*r* to develop, and in the case of rhotic accents there is no collapse of contrast and subsequent reanalysis which could provide this trigger. If hiatus filling is inherently desirable across varieties then we should expect a sandhi process to have developed wherever hiatus occurs, but although rhotic varieties do often have liaison ([j] and [w] after high vowels for instance), there is not widespread evidence of sandhi developing after non-high vowels in rhotic varieties. This is precisely why examples which show this has occurred (in early New Zealand English and in my data for East Lancashire English) are notable. So, phonological models exist which do not ban rhotic speakers from having intrusive-*r*, but these models do not account for why rhotic speakers would develop it. We are left with the conclusion that social contact must be the trigger for this phonological change to occur: this is a sociophonological change.

8.3 What is gained from adopting a model of sociophonology

Taking a purely phonological approach does not explain the variation in the East Lancashire data: this conclusion is hardly surprising given that '[v]ariation has . . . not been a prime concern in the development of most phonological models' (Foulkes & Docherty 2007: 497). Given that there is evidence both of variation (across speakers and across the five groups of speakers

associated with the five localities) and apparent time change in my data, how is this variation best accounted for?

The distinction between the *actuation* and the *implementation* of a sound change has been discussed frequently in the literature. Weinreich et al. (1968) provide an early proposal for how linguistic change begins, and argue that this 'may involve stimuli and constraints both from society and from the structure of language' (1968: 186). The process of actuation is labelled as a 'riddle' (ibid.), and a similar description is still being used thirty years later by Labov (2001: 466): 'There remains, as ever, the actuation problem. Why here and now? The beginnings of change are as mysterious as ever. Why *not* here and *not* now?'. Although the implementation or transmission of change is also a 'truly formidable' problem (Labov 2001: 466), the quantitative approach of variationist sociolinguistics has cast light on how change can be transmitted through society and across generations.

Blust (2005) addresses both *actuation* and *implementation* in a discussion of the motivation for sound change; the issues he discusses apply to the East Lancashire data. One sound change in my data is the loss of surface coda-*r*. This loss can be argued to be a variable change in the realisation of an underlying form for some of my speakers, but there is evidence that there is a structural change across apparent time in my sample: some of the younger speakers are (almost) consistently non-rhotic in places where older speakers are variably rhotic. The development of non-rhoticity has been argued to be a widespread and natural change, so it does not seem necessary to appeal to external factors in asking why it should happen. The younger speakers who seem to have lost rhoticity are 'doing what comes naturally' (Blust 2005: 222).

However, the development of intrusive-*r*, as shown in the levels of surface intrusive-*r* in the data for my East Lancashire speakers, is not clearly a natural endogenous linguistic change. If intrusive-*r* is a manifestation of a general *r*-sandhi process, one which is definitionally restricted to non-rhotic speakers, then its development can be argued to be caused by the loss of contrast between *r*-ful and *r*-less words. If this account is true and yet *rhotic* speakers in my survey also produce intrusive-*r*, then we must be dealing with the socially conditioned implementation of an existing change. Rhotic speakers do not have internal motivation for such a change to appear, but they could adopt the surface feature because of socially conditioned factors.

However, if intrusive-*r* and rhoticity are necessarily in complementary distribution, then the same socially-conditioned dialect contact factors should lead to simultaneous loss of rhoticity in

the same speakers who adopt intrusive-*r*. This is true for some speakers (younger speakers in Bury and Ramsbottom, for instance) but clearly not true for younger Rossendale speakers. Perhaps then, the accounts which do not ban rhotic speakers from producing intrusive-*r* (most convincingly Uffmann (2007), but also Harris (1994) and Broadbent (1999)) are a better explanation. However, these too do not explain why speakers should spontaneously innovate intrusive-*r*. If filling hiatus with *r* really is the most optimal solution, or is the automatic result of feature spreading, then it is surprising that all rhotic speakers have not long ago developed intrusive-*r*. The rarity of the mixed rhotic-and-*r*-intruding system of my young Rossendale speakers (together with the insistence in most of the literature that such speakers do not exist) shows that this has not happened.

In this project, the answer to RQ6 involved considering whether there is a link between reduction in, and eventual loss of, rhoticity and development of *r*-sandhi. The results show that there is, and that this can be observed in synchronic terms across dialectological space, which matches earlier findings that this link can be observed diachronically. This finding supports the view that the two phenomena are linked. However, the link is not as straightforward as is implied in accounts that make a binary distinction between labelling speakers as rhotic or non-rhotic: another question is how to model phonologically a set of speakers who vary in surface terms in their production of coda-*r*. When the labels 'rhotic' or 'non-rhotic' are used, is it possible for these to be variable, so that some speakers can be 'more rhotic' than others? My data show that it is necessary to distinguish between surface rhoticity and underlying rhoticity. On the surface one clearly can compare speakers' levels of coda-*r* production. In terms of their phonological systems, I claim that most of my speakers are rhotic in the phonological sense, and have a deletion rule that applies with varying frequencies across different speakers. These speakers have some mechanism that leads to intrusive-*r*, and this too operates with varying frequency.

In terms of what causes the appearance of intrusive-*r*, taking a diachronic long view, the link with loss of rhoticity is hard to avoid. Most rhotic accents do not feature intrusive-*r*; many non-rhotic accents do. However, synchronically, it has been shown that intrusive-*r* is not incompatible with surface coda-*r*, so long as some explanation for the actuation of intrusive-*r* is proposed. Social contact is sufficient to explain the presence of intrusive-*r* in the specific case of rhotic East Lancashire speakers.

However, there is no principled reason why intrusive-*r* should not have spontaneously arisen in other varieties that were still rhotic: the problem of dealing with a vowel hiatus existed for these speakers too. This would be a linguistic motivation for the actuation of an intrusive-*r* process. Blust goes further though, suggesting that in principle, a change can arise spontaneously for social reasons, rather than just being spread for social reasons: 'it may well be discovered that, although many sound changes begin as a result of automatic phonetic processes working on the mechanics of speech, others not only are spread through linguistic communities, but *arise* through a conscious effort to distinguish the speech of one social subgroup from that of another' (2005: 264). The fact that this has not happened widely regarding the adoption of intrusive-*r*, suggests that for most rhotic varieties of English neither endogenous linguistic reasons nor exogenous social reasons are sufficiently pressing for speakers to develop intrusive-*r*. As McCarthy notes, 'in other American English dialects, the hiatus in examples like *sawing* is . . . perfectly good' (1993: 191n).

However, something must have caused my rhotic East Lancashire speakers to develop intrusive-*r*. Blust argues that if linguistic motivation for the actuation of a sound change is ruled out, then 'some phonological developments which deviate sharply from expected types of change are legitimate examples of socially-motivated sound change' (2005: 229). The development of intrusive-*r* in rhotic speakers is indeed a deviation from an expected phonological system, according to most phonological accounts. However, the question remains of whether this counts as actuation of a new phonological system (simultaneously rhotic and *r*-intruding), or whether the two phonological features can be considered separately, in which case this is merely implementation of one change (development of intrusive-*r*) independently of a separate feature (rhoticity).

Blust notes the traditional focus of sociolinguistics on the implementation of sound change, rather than its actuation: 'Although sociolinguists have convincingly demonstrated the social motivations of many sound changes, these studies have been concerned exclusively with the recruitment of existing linguistic variants for indexical purposes within a subgroup of society' (2005: 228). This is one approach that can be taken to the Rossendale younger speakers. However, it ignores the phonological systems that these speakers have. Where this approach can work for sociolinguistic variables for which the choice of variant used has no particular effect on the phonological system, intrusive-*r* is linked to the wider phonological system. If intrusive-*r* is

an existing variant what is it a variant of? This approach would be sufficient if the combination of non-rhoticity and intrusive-*r* (an existing system, perhaps indexical of Manchester speech) were adopted hand-in-hand by rhotic East Lancashire speakers, but the two features appear to be separate. The adoption of intrusive-*r* while rhoticity is maintained creates a new system, and no other groups of speakers have this system. If this development is socially indexical it is perhaps a way of being simultaneously different from surrounding speakers (maintaining rhoticity where surrounding speakers have lost it) and also similar to surrounding speakers (using intrusive-*r*).

The social significance of the adoption of intrusive-*r* may well be to fulfil some sort of indexical function, but in the case of the younger Rossendale speakers, the result is a new phonological system.

McMahon (2003) stresses the importance of asking the right questions in carrying out phonological investigation and analysis. I think it is also important to consider the limits of the answers to the questions asked. In cross-dialectal terms, this project does not disprove the theory that rhoticity and intrusive-*r* are linked. It does, however, show that surface tokens of coda-*r* and intrusive-*r* can be produced by the same speaker, and this evidence problematises the idea of a binary distinction between 'rhotic-and-non-*r*-intruding' accents and 'non-rhotic-and-*r*-intruding' accents. In one specific instance a completely unpredicted pattern is observed: younger Rossendale speakers increase both coda-*r* and intrusive-*r*. This finding shows that in particular social circumstances both features can be favoured, but does not overturn the majority of evidence that the two phenomena are negatively correlated.

8.4 Summary

This research disproves the claim that rhoticity and intrusive-*r* are in complementary distribution in all dialects: there are speakers who have both. It supports the claim that the two features are negatively correlated: most of the speakers in my dataset fit an overall pattern where more surface coda-*r* links to fewer intances of intrusive-*r*. Because of the overlapping distribution of rhoticity and intrusive-*r*, this research does not support the idea that intrusive-*r* arises through analogy with linking-*r* alternations. It does support phonological accounts which use the need to fill hiatus as a motivation for use of intrusive-*r*. While these accounts have still maintained that the linking-*r* alternations are necessary to actuate the development of intrusive-*r*, this research suggests that social factors of contact could provide a motivation for intrusive-*r* to be adopted. Social factors alone though do not limit the use of non-etymological *r* to sandhi environments:

this combination of social and phonological causes and constraints on the adoption of a new feature by speakers of a particular variety of English means that the change is best accounted for in terms of sociophonology.

Johnson & Britain (2007) claim that 'theoretical phonologists tend not to get their hands dirty with 'real' data, preferring to rely on intuitions or on sanitised data produced by other researchers, whereas sociolinguists, who collect and work with real, and hence variable, language data, rarely attempt to produce a phonological explanation for their results'. In this study I have attempted to bridge this gap, and although there are still questions to be answered—both phonological and sociolinguistic—this sociophonological approach has suggested some answers and it should continue to be a productive way of working in future research.

Chapter 9

Conclusion

This study has produced results that are relevant to several different fields of linguistic enquiry. In terms of geolinguistic investigation, I have given an up-to-date indication of the local dialectological distribution of rhoticity and of *r*-sandhi in East Lancashire. I have investigated some of the socio-cultural factors that may shape linguistic behaviour in this region, and have shown how these match the linguistic patterning of both rhoticity and *r*-sandhi. The local phonological conditioning environments for production of coda-*r* and for *r*-sandhi have been investigated, and I have shown that there are subtle differences in the rates of production of these phenomena depending on the nature of the preceding and following segment. Other linguistic conditioning factors have also been shown to be significant: the level of stress on the preceding syllable and, in the case of sandhi contexts arising from suffixation, the stratum of the suffix.

Moving beyond the specific social context of communities in East Lancashire and the specific phonological issues of rhoticity and *r*-sandhi, the study addresses the more general issue of variability in linguistic systems and methods of accounting for the patterns of variation found in a corpus of real-world data. I argue that my data support the hypothesis that there are discrete underlying systems, and that surface variation can be explained in terms of variable application of rules or constraints that make up these systems. Change across the generations can be modelled in terms of a move from one system to another, rather than necessitating the adoption of a different model, such as proposing that change across the generations reflects a change in the distribution of stored exemplars in a continuously variable exemplar cloud.

The answers to RQ1-4 were discussed in Section 5.12 (p. 195). The following sections touch on these questions again in the light of the further discussion of the topics of dialectology, sociolinguistics, phonology and sociophonology that has been presented in Chapters 6, 7 and 8. In addition, some answers to the 'big picture' questions in RQ5, 6 and 7 are summarised.

9.1 Rhoticity

In addressing RQ1 and RQ2, I have shown that the proportion of realised surface rhotics varies between speakers, and between groups of speakers. The overall trend across apparent time is towards a decline in rhoticity: this is particularly evident when comparing the older and younger Ramsbottom speakers (see Figure 5.5, p. 120). However, there is a counter-tendency in the Rossendale sample: Figure 5.5 shows that the younger speakers there realise a higher percentage of potential rhyme *r*s than do the older speakers. This finding is in line with various existing accounts of attrition of rhoticity in other dialects, and with models of dialect levelling more generally. While the overall trend is towards a supra-local levelled system, there is evidence of an *anti-levelling* tendency in Rossendale. This may be the reported 'last gasp' of rhoticity before its eventual loss in these areas too, or it may be an indication of the emergence of a new system. Only further real-time investigation in the future can determine which of these is the case, but the Rossendale speakers' use of intrusive-*r* lends some weight to the idea that a new system is emerging, rather than that young Rossendale speakers are maintaining a traditional East Lancashire phonological system.

My data show no task effect on the level of production of rhoticity: there is no significant difference between the level of rhoticity in casual conversational speech and the speech generated by the reading and elicitation tasks. If rhoticity were above the level of consciousness and functioned as a sociolinguistic marker (Labov 2001: 196) then style shifting would be expected. Instead, rhoticity functions as an indicator (Labov 2001: 196): it varies across social groups (older versus younger speakers, speakers from the different localities in the survey) but is apparently not subject to overt social awareness. This result is perhaps a little unexpected given the general low-prestige associated with rhoticity in England, and the fact that rhoticity is seen as diagnostic of Lancashire speech by speakers of neighbouring varieties (Wells 1982: 367). However, it does match the findings of Austin (2007), who noted an apparent lack of awareness of rhoticity by his East Lancashire participants, even among those who were aware of other potential markers of East Lancashire speech, such as use of non-standard *were* (Austin 2007: 55).

9.2 Phonological context: preceding segment

In addressing RQ3, my investigation of the effect of the preceding segment of the realisation of *r* (coda-*r*, linking-*r* and intrusive-*r*) revealed an interesting pattern. Coda-*r* realisation did vary significantly according to the preceding segment, whether the coda-*r* was in a word-final or non-word-final position. The preceding segment least favouring the production of a following coda-*r* was [ə], although Figure 5.48 (p. 176) shows that in non-boundary position a preceding [ɜ] was also quite unlikely to be followed by a realised coda-*r*, compared to the higher rates of coda-*r* production after [ɑ,ɔ]. This pattern can in part be attributed to the unstressed nature of syllables in which schwa was the segment preceding a potential coda-*r*.

When it came to linking and intrusive-*r*, I found that the preceding segment caused significant variation in the realisation of *r* in word-final cases of linking-*r* and in non-word-final cases of intrusive-*r*. I hypothesised that word-final linking-*r* was more variable than word-internal linking-*r*, and was thus more susceptible to the influence of the preceding segment. In the case of intrusive-*r* the pattern was apparently reversed. This suggests that word-final intrusive-*r* may have become established as a productive phonological feature, which is produced whenever a hiatus is encountered in an appropriate intrusive context. In contrast, word-internal intrusive-*r* is perhaps still much more variable and is therefore open to the influence of specific constraints, such as the nature of the preceding segment.

9.3 Morphological context: different suffixes

A further aspect of RQ3 involved *r*-sandhi resulting from suffixes associated with different strata. The elicitation task was constructed in a manner which allowed a consideration of the influence on the production of linking and intrusive-*r* of the stratum of the suffix that caused the sandhi context. Predictably, given the lack of variation in word-internal linking-*r*, the stratum of the suffix did not lead to significant variation in the production of word-internal linking-*r*. When word-internal intrusive-*r* was investigated, however, I showed that stratum 2 suffixes were significantly less likely to result in production of intrusive-*r* than were stratum 1 suffixes or suffixes which could be analysed as either 1 or 2. This finding emerged both from testing the distribution of tokens of intrusive-*r* across different following suffixes (Table 5.30, p. 182) and from a multivariate analysis of the data (Figure 5.59, p. 192). Stratum 1 suffixes typically cause stress shifting, which may have meant that the tendency for stratum 1 suffixes to favour

production of intrusive-*r* actually reflects a tendency for stressed syllables to favour production of intrusive-*r*. However, this is the opposite tendency from that shown in Figure 5.11.3 (p. 187) where unstressed syllables were more favouring of intrusive-*r* production than were stressed syllables. Furthermore, many of the participants did not consistently produce stress-shifting patterns in the elicitation task responses, and so the effect of stratum of suffix on the production of intrusive-*r* cannot be attributed solely to the effect of stress-shifting. This is certainly an area that could be tested further in future research that focuses more specifically on morphological factors influencing production of word-internal intrusive-*r*.

9.4 Correlation between rhoticity and intrusive-*r*

RQ4 mentions the possibility of an overlapping distribution of rhoticity and *r*-sandhi. The results given in Chapter 5 show that there is a significant negative correlation between level of rhoticity and level of intrusive-*r*. Across my sample population as a whole, the more rhotic a speaker, the less likely she is to produce intrusive-*r*. So, the overall picture matches general historical accounts of the emergence of *r*-sandhi, in which it is claimed to develop after a loss of rhoticity, and empirical corpus-based results which also indicate a negative correlation between levels of rhoticity and of *r*-sandhi (Hay & Sudbury 2005).

Now, Hay & Sudbury (2005) claim a causal relationship between the two phenomena, rather than merely a coincidental correlation, and most of my data are compatible with such a causal relationship. However, as in the case of the apparent time analysis of rhoticity, the younger Rossendale speakers are an exception to this rule. They show both increased rhoticity and increased production of intrusive-*r* compared to the older Rossendale speakers. Clearly, this group of speakers diverges from the rest of the population in terms of the lack of correlation between the two features, and this challenges the notion that intrusive-*r* is caused to develop by a prior loss of rhoticity. These speakers have certainly not lost rhoticity, but have developed intrusive-*r*. It is possible for intrusive-*r* to emerge in the phonology of a speaker in a manner that is not conditioned by that speaker's rhoticity. While for the majority of speakers in this study, and for the majority of documented varieties of English more generally, a causal link between loss of rhoticity and emergence of intrusive-*r* is the most convincing explanation, the divergent behaviour of the Rossendale speakers shows that this is not a universal explanation.

9.5 Lack of hyper-dialectal *r*

A potential counter-argument to my claim that East Lancashire speakers, in particular young Rossendale speakers, are simultaneously rhotic and *r*-intruding, would be that the 'intrusive-*r*' is in reality a hyper-dialectal *r* that is not limited to sandhi contexts. This would call into question a positive answer to RQ4. Such a feature is reported in areas of the South West of England where there is contact between rhotic and non-rhotic dialects. However, I have shown that this is not the case in East Lancashire. For example, the elicitation task was designed to generate non-suffixed citation forms of the place names as well as the suffixed forms that generate sandhi contexts. Hyper-dialectal *r* was not produced in these utterances, and was vanishingly rare across the corpus of all speech styles and all speakers. This is extremely important in accounting for the relationship between rhoticity and intrusive-*r*. While it could be the case that *r* functions as a signifier of localness in the face of the encroaching, supralocal, non-rhotic variety, the lack of hyper-dialectal *r* shows that this potential function of *r* is subject to phonological constraints on its occurrence. The young Rossendale speakers whose increase in rhoticity provides evidence for the potential emergence of *r* as a marker of local identity do not insert *r* just anywhere in non-etymological contexts. They do increase their rate of non-etymological *r* production, but this is subject to the same sandhi conditioning context that applies to intrusive-*r* in the encroaching supra-local non-rhotic variety.

9.6 Variation

RQ5, 6 and 7 all touch on the ability of explanatory linguistic models to account for variation. While other corpus-based studies of phonological variation have been used to argue for an exemplar-based model of phonology, my results do not point in this direction. I have shown that the apparently continuously variable surface data I gathered can be analysed as corresponding to two variable but discrete underlying systems. There is evidence that, through apparent time, new generations of speakers switch from the older system to the newer system, rather than gradually showing a slightly different linguistic behaviour conditioned by a variation in their cloud of exemplars. For example, the older Ramsbottom speakers can be convincingly modelled as being underlyingly rhotic, with variable application of a deletion rule (or a constraint ranking that fails to produce surface *r*). In contrast, the younger Ramsbottom speakers have 'flipped' to being underlyingly non-rhotic; they do not produce rhyme-*r* to any significant extent, so rather

than being modelled with a deletion rule which applies almost 100% of the time, they can be modelled as being underlyingly non-rhotic. They produce linking and intrusive-*r*, consistent with the behaviour of speakers of other non-rhotic varieties such as RP. This apparent time change can be modelled as a change between discrete systems: there is no need to propose a continuously variable exemplar model.

The fact that some individual speakers are simultaneously rhotic and *r*-intruding is again not indicative of an exemplar-cloud model in which clouds of tokens of each phenomenon are stored. Although this mixed behaviour contradicts the claims made by some phonologists about the impossibility of rhoticity and *r*-sandhi being in parallel distribution, in fact I suggest that their models do not in principal ban rhotic speakers from producing intrusive-*r*. Furthermore there are other accounts which much more explicitly predict that mixed rhotic-and-*r*-intruding speakers could exist. I have provided evidence that they do.

9.7 Future research

Further work should be carried out with respect to the various levels of inquiry addressed in my study. In terms of dialectology, further data collection and analysis in East Lancashire would provide a more fine-grained indication of the geographical and social extent of rhoticity: a degree of real time comparison would also be possible given future data collection.

Of particular interest are the speakers in areas that currently border the area of residual rhoticity. According to my results, Ramsbottom speakers have become non-rhotic: their non-rhoticity and their production of *r*-sandhi match the supralocal incidence of these features. My results also suggest that Accrington speech is undergoing a loss of rhoticity. Future data collection could show whether Accrington speakers will follow the same path taken by Ramsbottom speakers in losing rhoticity and developing a productive *r*-sandhi system.

Future data collection in Rossendale would be interesting in dialectological and phonological terms. Descriptive dialectological reports would show whether the mixed rhotic-and-*r*-intruding pattern I observed is present in a wider sample of Rossendale speakers, and whether this pattern shows signs of stabilising as a new 'Rossendale' variety. Phonologically, further investigation into the linguistic constraints on production of coda-*r* and intrusive-*r* would cast further light on precisely how such a mixed system is structured.

My data show that East Lancashire speakers do not produce hyper-dialectal *r* to any great extent, even where they have apparently adopted a sandhi-conditioned intrusive-*r* process. Future

research could investigate this in more detail. While the evidence from my elicitation task in particular, but also from the reading and conversation tasks, suggests that East Lancashire speakers do not have hyper-dialectal *r*, this has been reported in some studies, such as Vivian (2000). Collecting a controlled set of data to investigate the realisation of [ɑ] and [ɔ] would be a useful task: where East Lancashire hyper-dialectal *r* has been claimed, the examples given are typically words such as *lager* [lɑˑːgəɹ] or *sauce* [sɔːɹs].

A comparative study of the rhoticity isoglosses in Lancashire and in the West Country would also be an interesting project. For example, accounts of West Country varieties mention [ɑ, ɔ] as 'sporadically' (Wells 1982: 343) attracting hyperrhoticity, but specifically focus on hyperroticity with [ə] in examples such as *banana* [bənɑːnəˑ] (Wells 1982: 343). Given that the South West and Lancashire both provide sites of extensive contact between rhotic and non-rhotic speakers, it would be instructive to see if rhoticity and intrusive-*r* develop in the same way in these two different areas.

The current study has cast light on the ways in which dialect contact may influence phonological change and provided some evidence that, while such contact may produce atypical developments in the speech of some communities (rhotic speakers with intrusive-*r* are clearly very rare across varieties of English), these developments are compatible with, and indeed are shaped by, models of what is possible in phonological systems. My results suggest that there is no need to throw the phonological baby out with the empirical bathwater. A sociophonological approach in which both the *socio* and the *phonological* aspects inform each other should continue to be productive in future research.

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